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OBSERVATIONS ON THE COCCIDAE OF FORMOSA

PART II

BY

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OBSERVATIONS ON THE COCCIDAE OF FORMOSA.—II.

By

Ryoichi Takahashi

Introduction.

Since the publication of the part one of this series of papers, Dr. G. Bellio has described *Parlatoria pergandei* Comst. and its variety, *camelliae* Comst.,[1] collected by Prof. F. Silvestri in Formosa, and I have recorded some species of the family from Hokoto (Pescadores Islands).[2]

In this contribution I will set forth the results of my studies on the Coccidae attacking bamboo in Formosa and will also record certain species injurious to various plants from Formosa and Loochoo.

Pseudaonidia duplex Ckll., *Chrysomphalus dictyospermi* Morg. and *Pinnaspis aspidistrae* Signt. were not placed among the more important pests in the former report, but they all have been found in abundance, causing serious damage to *Cinnamomum* or *Citrus*, and they must be regarded as very injurious pests in our island.

Here I express my cordial thanks to Prof. T. Shiraki, Mr. E. E. Green, Dr. I. Kuwana and Dr. H. Morrison for their kind help in various ways.

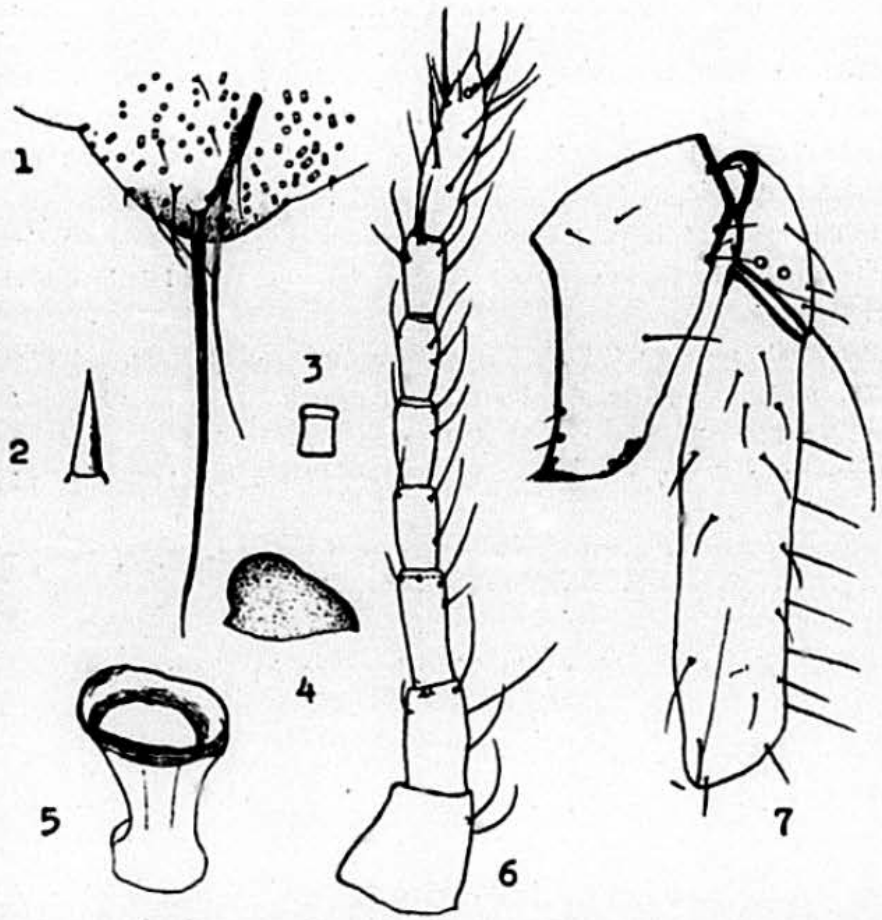
Some Coccidae attacking bamboo in Formosa.

Pseudococcus bambusicola n. sp.

(Adult female) Covered with white secretion, with a few very short, stout waxy projections at the posterior end. Body oval, moderately convex, broadly rounded on both ends, about twice as long as wide in mounted specimens, almost parallel on the sides on the middle part. Eyes submarginal. Antennae 8-jointed, with some very long bristles which are longer than the 4th antennal joint; the 1st joint stout, somewhat tapering, almost as long as wide; the 2nd about twice as long as wide, with a very small sensorium at the apex; the 3rd about thrice as long as wide; the 4th, 5th, 6th

(1) Boll. Lab. Zool. Portici, XXII, pp. 229-234 (1929).
(2) Trans. Nat. Hist. Soc. Formosa, XIX, pp. 428-431 (1929).

and 7th somewhat narrowed towards the base; the 7th with a stouter bristle near the apex; the 8th with 3 stouter bristles and a small sensorium near the apex; the relative length f joints about as follows: I—20, II—19, III—19, IV—14, V—14, VI—13, VII—13, VIII—28. Mentum 2-jointed, much longer than wide, tapering, rounded at the tip, with some curved setae at the tip and a pair of much longer uncurved bristles near the apex. Spiracles rather stout, expanded towards the distal end, less so on the base, with no pores, the posterior ones larger. Hind coxae large, about 1.5 times as long as wide, angulated and rounded near the base on the outside,



Pseudococcus bambusicola n. sp.

(Adult female)

Fig. 1. Anal lobe.
Fig. 2. Cerarian spine.
Fig. 3. Stout marginal duct.
Fig. 4. Eye.
Fig. 5. Posterior spiracle.
Fig. 6. Antenna.
Fig 7. Hind coxa, trochanter and femur.

with numerous rather large pores in a group over the whole length; trochanters with 2 pores and 6 bristles, of which one is much longer; femora with many long bristles, middle femora a little longer than the tibia, but hind femora almost as long as the tibia, about 4 times as long as wide; tibiae not swollen, lacking pores, with some long bristles and 2 shorter, stouter, setae near the distal end; hind tibiae about 8 times as long as wide, more than twice as long as the tarsus; tarsi about 4 times as long as wide, digitules slender, capitate; claws with no denticles, with stouter, distinctly capitate digitules. Abdominal segments defined. Anal opening strongly chitinized on the margin, with an irregular row of rather large oval or irregular pores (about 80), surrounded with 2 dense rows of smaller pores, each with a black spot, on the anterior half, and with a single row of similar pores on the posterior; anal setae 6 in number, stout, much longer than the diameter of the ring. Dorsal anterior and posterior ostioles almost equal in size, rather small, the posterior ones more developed. A ventral cicatrix quadrate, at the midle of abdomen, constricted at the middle, with rounded corners. Anal lobes a little protruding, more chitinized, with a chitinized slender part running forwards and about 6 bristles (besides the apical seta), of which one is much longer; apical setae slightly stouter than, and about 1.7 times as long as, the anal seta, slightly curved. Cerarii developed, 36 in all, scarcely protruding, the 2nd pair in front of the antennae, the 3rd in front of the eyes; the anterior 17 pairs each somewhat chitinized around the bases of the spines, with about 15 or 16 minute triangular pores in a loose cluster, the last pair chitinized over the whole area, but not well defined, with numerous triangular pores; cerarian spines conical, pointed, small, slightly longer in the posterior 2 or 3 pairs; those in the last pair the longest, about 2.5–3 times as long as wide; numbers of spines in each cerarus about as follows: 1st pair–3 or 4, 2nd–3–5, 3rd–5, 4th–5, 5th–4, 6th–3 or 4, 7th–5, 8th–4, 9th–3, 10th–4, 11th–3, 12th–3 or 4, 13th–2, 14th–3 or 4, 15th–2–4, 16th–3 or 4, 17th–4 or 5, 18th–6. Some short, slender, spine—like setae scattered on the dorsum and sides, most of which are slightly curved on the distal part; many long bristles on the venter, about 8 much longer stouter ones in a transverse row on the venter of each abdominal segment, of which the lateral ones on the penultimate 2 segments are much longer; numerous stout long bristles between the antennae, the ventral stout setae more slender than the anal seta. Pores on the body of 4 types; (1) numerous minute almost trianguler pores scattered over the whole surface, but almost absent among the larger circular pores; (2) larger circular multilocular pores only on the posterior part of venter, numerous in a large cluster around the genital opening and about 60 in number in a transverse row in front of the genital cluster, the cluster and row not reaching the side of body; (3) numerous minute ducts on

the posterior half of venter, more numerous than the triangular pores on the posterior part, almost equal to or slightly larger than the triangular pore in diameter; (4) a few similar, but smaller outer ducts along the body margin, somewhat smaller than the circular multilocular pores in diameter, subequal in diameter to the basal part of the cerarian spine, somewhat longer than wide.

Length of body—about 3.75 mm. Antenna—abut 0.71 mm. Mentum—about 0.27 mm. Posterior spiracle—about 0.09 mm. Hind coxa—about 0.23 mm. Hind femur—about 0.38 mm. Hind tibia—about 0.37 mm. Hind tarsus—about 0.16 mm. Apical seta—about 0.323 mm. Anal seta—about 0.19 mm. Last cerarian spine—about 0.023 mm. Anterior cerarian spine—about 0.014 mm. Dorsal spine-like seta—about 0.02 mm. Duct—about 0.0092 mm. Cicatrix—about 0.152 mm. Width of dorsal ostiole—about 0.074 mm. Diameter of anal ring—about 0.092 mm. Multilocular pore—about 0.009 mm.

Host.—Bambusa sp.

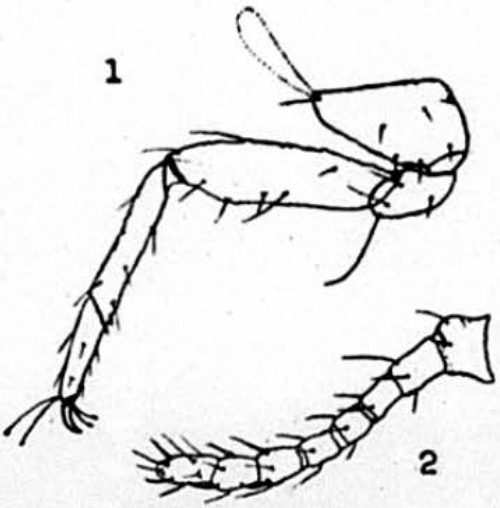
Hab.—Suisha.

Two adult females were collected by the author on Jan. 26, 1930. This species is allied to *Pseudococcus monticola* Green, but differs from it in the following characters: (1) Body without submarginal pits. (2) Spiracles different in shape. (3) Anal setae shorter, etc.

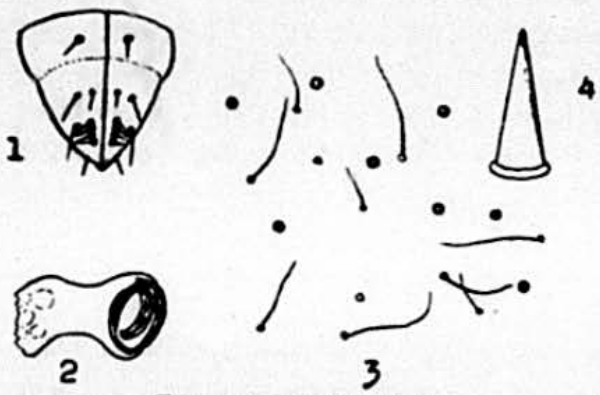
Trionymus formosanus n. sp.

(Adult female) Yellowish brown, covered with white powder and appears to be purplish, with about 4 short wax processes on the posterior end. Body elongate oval, broadest at the basal part of abdomen, moderately convex on the dorsum, rounded on both ends, about twice as long as wide in life, but about 1.4 times as long as wide in mounted specimens. Eyes marginal, small, about 0.023 mm. in diameter. Antennae short, usually 8-jointed, with some long bristles; the 1st joint slightly wider than long, somewhat rounded on the mesal side; the 2nd cylindrical, about 1.5 times as long as wide, with a small circular sensorium at the tip; the 3rd almost as long as wide, sometimes fused with the 4th; the 4th a little wider than long; the 5th as long as wide; the 6th a little longer than wide, narrowed towards the base, with an apical very stout bristle; the 7th as in the 6th; the 8th broadest at the base, about twice as long as wide, with 2 very stout setae; the relative length of joints about as follows: I—10, II—10, III—5, IV—4, V—5, VI—7, VII—8, VIII—10, Rostrum very short, conical, rather pointed, almost as long as wide, 2—jointed; the basal joint shorter than the distal, with a pair of setae; the distal joint with 16 setae, of which 8 are arranged in 2 longitudinal rows (4 setae in each row) near

the tip. Spiracles expanded on the basal and distal parts, lacking pores, with a few large areolations on the base; the anterior ones wider at the base; the posterior ones a little larger than the anterior, wider at the distal part. Legs short, with a few rather fine long bristles; hind coxae rough on the surface, without pores; trochanters with 2 small circular pores and a long distal bristle which is shorter than the trochanter itself; femora rather stout, somewhat swollen on the front side, about 4 times as long as wide, a little longer than the tibia; hind femora with about 8 bristles; tibiae lacking pores, about 4 times as long as wide in the middle pair, but about 5 times as long as wide in the posterior pair, not swollen, with a stout seta near the tip; hind tibiae about 1.7 times as long as the tarsus, with about 5 long bristles; tarsi tapering, about 4 times as long as wide, with 2 long slender somewhat knobbed digitules; claws without denticles, the digitules stouter than the tarsal ones, knobbed. Abdominal segments somewhat defined. Anal ring chitinized, with 2 rows of pores; pores in the inner row larger, fewer, about 40 in number in all; 6 setae distinctly stouter than the apical one, longer than the diameter of the ring, somewhat curved. Dorsal anterior and posterior ostioles rather small; the posterior ones slightly larger. A ventral cicatrix rather small, a little longer than wide or wider than long, somewhat constricted about the middle, with rounded corners. Anal lobes slightly developed, without chitinized thickenings; apical setae somewhat curved, as long as or a little shorter than



Trionymus formosanus n. sp.
(Adult female)
Fig. 1. Posterior leg.
Fig. 2. Antenna.



Trionymus formosanus n. sp.
(Adult female)
Fig. 1. Rostrum.
Fig. 2. Posterior spiracle.
Fig. 3. Pores and hairs on head.
Fig. 4. Cerarian spine.

the seta of the anal ring. Cerarii present only on the posterior 2 segments, not chitinized; the last cerarii each with 2 spines and about 17 minute triangular pores in a loose cluster; the penultimate cerarii each with 1 or 2 a little shorter spines and a few (about 6) triangular pores; cerarian spines conical, small, pointed, but not so sharply, about thrice as long as wide; sometimes a cerarian spine present on the prepenultimate segment. Body with many rather short fine bristles over the whole surface, which are very few on the middle areas of the dorsum and venter; a longer bristle present near the penultimate cerarus which is shorter than the similar one on the anal lobe. Dermal pores of 3 types; (1) many circular multilocular pores distributed over the whole surface, more numerous on the posterior portion, abundant in a loose large cluster around the genital opening and in a transverse cluster in front of it, the genital cluster extending to the posterior end of body and the transverse cluster extending to the margins; (2) minute triangular pores extremely few, present on venter; (3) small short tubular ducts somewhat longer than wide, much smaller in diameter than the circular pore, some on the marginal area, but more on the posterior portion.

Length of body—about 3.8–4.0 mm. in life. Width of body—about 2.0 mm. Length of antenna—about 0.28 mm. Posterior spiracle—about 0.046 mm. Cicatrix—about 0.1 mm. Last cerarian spine—about 0.018 mm. Apical seta—about 0.135 mm. Hind femur—about 0.175 mm. Hind tibia—about 0.138 mm. Hind tarsus—about 0.083 mm. Longer bristle on femur—about 0.037 mm. One bristle on body surface—about 0.046 mm. Diameter of circular pore—about 0.0054 mm. Largest diameter of anal ring—about 0.07 mm. (excluding the rows of pores).

Host.—Bambusa stenostachya, attacking the young shoot under the sheath.

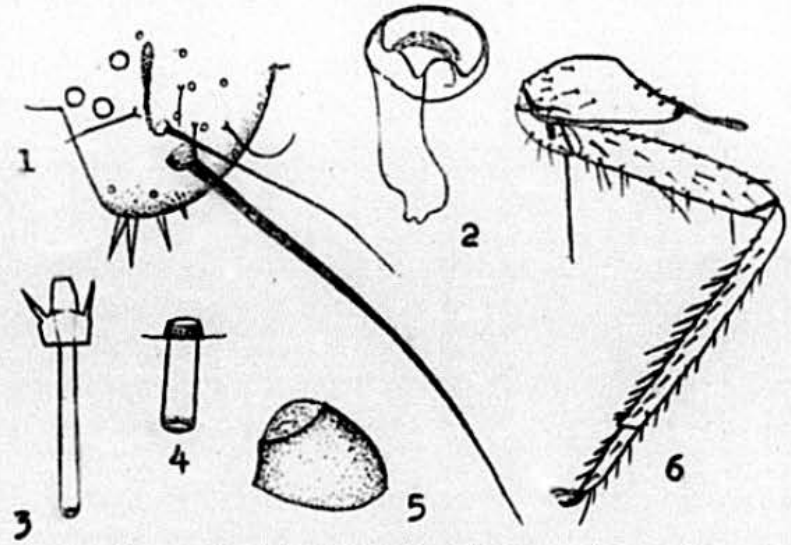
Hab.—Taihoku.

Common, sometimes occurring in large numbers. Described from specimens collected by me in August 1929. This species is peculiar in possessing few triangular pores on the body surface.

Phenacoccus bambusae n. sp.

(Adult female) Body powdered with white secretion which conceals the colour of the insect except at two pairs of dark green patches on the dorsum, and with many long fine straight filaments, closely resembling *Ferrisiana virgata* Ckll. in general appearance. Body oval, moderately convex, broad on both ends, almost straight on the anterior extremity, about twice as long as wide in mounted specimens. Eyes very large, submarginal, distinctly protruding, widened towards the base, slightly curved,

truncate at the apex, smaller than the 1st antennal joint. Antennae long, slender, situated between the eyes, 9—jointed, with many very long fine bristles which are as long as or slightly longer than the shorter antennal joints; the 1st joint stout, a little longer than wide, much wider than the following joints; the 2nd cylindrical, somewhat widened near the apex, about 3.2 times as long as wide, with a few longer bristles on the distal portion; the last 3 joints each with a stouter bristle near the tip; the last joint defined, but not so distinctly as others; the relative length of joints about as follows; I—18, II—26, III—20, IV—15, V—17, VI—15, VII—14, VIII—12, IX—20. Rostrum short, a little longer than wide, stout, more or less



Phenacoccus bambusae n. sp.
(Adult female)

Fig. 1. Anal lobe.
Fig. 2. Posterior spiracle.
Fig. 3. Tubular duct connecting with a tubercle.
Fig. 4. Protruding duct.
Fig. 5. Eye.
Fig. 6. Hind leg.

rounded at the tip. Spiracles widely expanded at the distal part, somewhat curved, without pores, the posterior ones a little larger than, but similar in shape to, the anterior. Legs rather long; coxae long, somewhat tapering, slightly convex on the mesal side, about twice as long as wide, lacking pores, with some setae; trochanters with 2 small circular pores near the distal margin and 6 bristles, of which one at the distal part is much longer, stouter and longer than the trochanter itself; femora very slightly convex on the anterior side, with many bristles which are a little curved and variable in length, hind femora about 5 times as long as wide, about 1.5 times

as long as the trochanter; tibiae slender, not swollen, as long as the femur in the anterior 2 pairs, but a little longer than it in the posterior pair, with many rather long bristles, some of which on the distal part are very stout; hind tibiae about thrice as long as the tarsus, more than 10 times as long as wide; tarsi tapering, about 5 times as long as wide, lacking capitate setae, with some long bristles; claws with a minute denticle about the middle, the digitules longer than the claw, slender, somewhat capitate. Abdominal segments defined. Anal ring situated on the posterior extremity, rather small, chitinized, with an irregular row of very small circular pores and 6 setae, surrounded with 2 rows of similar pores except on the anterior and posterior parts; anal setae very stout, much longer than the diameter of the ring. Dorsal anterior and posterior ostioles equal in size, rather small. A ventral cicatrix very large, transversely oval. Anal lobes distinctly protruding, wider than long, about as wide as the diameter of anal ring, chitinized on the dorsum, with a narrow chitinized part running forewards on the venter, 2 stout tubular ducts opening on the dorsum, some minute pores, and 6 long setae on the venter, of which one is much longer; apical setae very long, stouter than, and about 1.7 times as long as, the anal seta, somewhat curved. Cerarii 17 pairs in all, somewhat chitinized, but not well defined, with minute pores in a loose cluster and short spines which are variable in length; the 2nd pair situated in front of the antennae; the 3rd protruding, in front of the eyes; spines of the penultimate cerarii a little longer; 2 of the spines of the last cerarii much longer; cerarian spines normal in shape, sleder, pointed; numbers of spines and pores in each cerarus about as follows:

Cerarii	1st	2nd	3rd	4th	5th	6th	7th—14th	15th	16th	17th
Spines	2-3	5	6-8	3-4	2-3	5-6	2-4	6	5	8
Pores	6	6	Many	5-6	2-3	6-10	5-8	8	7-8	Many

Dorsum of body without hairs, but with many very minute pointed slender spines scattered over the whole surface, which spines are also on the marginal area, intermixed with triangular pores, equal in diameter to, but fewer than, the triangular pores, venter with many short setae except on the marginal area, many long stout bristles in a group between the antennae, about 8 of which are much longer, almost as long as the anal seta; about 4 long setae arranged in a transverse row at the middle of each of 5 abdominal segments anterior to the genital opening; and about 14 stout setae behind the genital opening; 6 long setae present along the side of abdomen besides the apical one, of which the posterior 2 are longer, almost as long as or

somewhat longer than the anal seta. Dermal pores of 4 types; (1) minute almost triangular pores numerous on the dorsum and lateral areas, very few on the posterior part of venter, absent on the remaining of venter; (2) larger circular multilocular pores numerous, but fewer than the triangular pores, scattered over the venter only, rather scarce on the middle area, about 70 in number around the genital opening; (3) slender tubular ducts connecting with a minute tubercle which is chitinized, abruptly widened on the basal half, not dilated towards the base, a little longer than wide, much shorter than the duct, almost truncate at the tip and with 2 or 3 minute slender pointed spines arising from the middle part; these ducts present along the margin and on the dorsum, about 14 in all in transverse rows on the front, those in the upper row somewhat stouter, 2 pairs on the dorsum of head between the antennae, about 30 along the side of body, some of which are smaller, 2–4 in a transverse row on each of the posterior 3 abdominal segments, 2 somewhat larger ones on each anal lobe; those on the front and posterior parts somewhat larger; (4) some tubular ducts a little protruding out of the derm, intermixed with the circular pores on the ventral sides of head and abdomen, in 7 groups on each side of abdomen (4–9 in each group), these ducts fewer and somewhat smaller in diameter at the apex than the circular pores, somewhat shorter than, but almost as stout as, the duct connecting with a tubercle.

Length of body—about 3.5 mm. Antenna—about 0.8 mm.

Antennal bristle—about 0.07–0.094 mm. Posterior spiracle—about 0.08 mm. Hind coxa—about 0.277 mm. Hind femur—about 0.43 mm. Hind tibia—about 0.49 mm. Hind tarsus—about 0.152 mm. Dorsal ostiole—about 0.092 mm. Cicatrix—about 0.3 23 mm. Larger tubular duct connecting with a tubercle—about 0.042 mm. (including the tubercle). Protruding tubular duct—about 0.023 mm. Apical seta—about 0.36 mm. Last cerarian spine—about 0.028 mm. One of anterior cerarian spine—about 0.018 mm. Short seta on abdominal venter—about 0.023 mm. Long seta on posterior part of abdominal venter—about 0.13 mm. Diameter of anal ring (between setae)—about 0.083 mm. Diameter of circular pore—about 0.0092 mm. Basal diameter of eye—about 0.06 mm.

Host.—Bambusa sp.

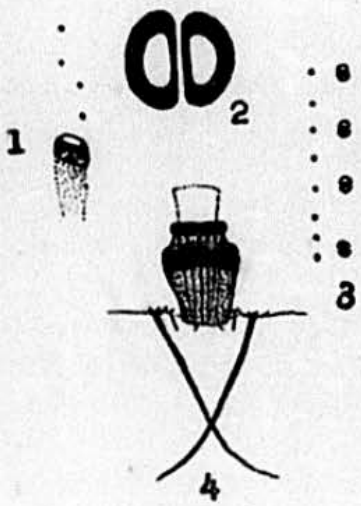
Hab.—Suisha.

Two females were collected by the author on Jan. 26, 1930. This species closely resembles *Ferrisiana virgata* Ckll. in general appearance, but differs from it in the antennal joints and possessing a tooth on claws, which indicate that the species is a *Phenacoccus*. Closely allies to *Phenacoccus takae* Kuw., differing from Kuwana's description and figures in the following characters: (1) Body smaller, with dorsal

patches. (2) Last cerarian spines slender. (3) Pores in the anal ring smaller, circular, arranged in 3 rows. (4) Tibiae not shorter than the femur. (5) Tibiae about thrice as long as the tarsus.

Asterolecanium minutum n. sp.

(Adult female) Test pale yellow in dry specimens, almost transparent, almost circular, somewhat narrowed on the posterior extremity, strongly convex on the dorsum, almost hemispherical, with excretory matter on the margin, lacking fringe. Body a little longer than wide, broadest about the middle, broadly rounded on the front, somewhat narrowed towards the end on the posterior portion, sometimes with 2 or 3 small, deep, irregular indentations on the cephalothorax. Antennae more widely separated from each other than from the front margin, minute, wider than long, with 2 stout curved setae which are longer than the antenna; distance between antennae about 0.064 mm. Spiracles very short, wider than long, not expanded on either end; about 7 or 8 minute circular pores between the spiracle and body margin. Rostrum not reaching a line drawn between the hind spiracles, the basal part very large. Anal ring about 0.023 mm. distant from the posterior extremity, with 6 setae which are reaching the posterior extremity of body, but not beyond it; a transverse chitinized plate present behind the anal ring, which is somewhat wider than the ring. Apical setae long, stout, crossed, somewhat curved, not arising from lobes, with 4 minute setae between them. Anal aperture somewhat narrowed towards the posterior end. Tubular ducts long, slightly widened towards the base, absent on the marginal area. Marginal paired pores very small, of equal size, in a single row, distant from each other by more than their own length, absent on the posterior half of abdomen; about 5 or 6 dorsal paired pores present on the submarginal area, much larger than the marginal ones; paired pores not circular, not connected together, normal, with no pores between them. Many minute circular pores in a single regular row near the row of marginal paired pores, but not close to it. No cribriform plates present.



Asterolecanium minutum n. sp.
(Adult female)
Fig. 1. Anterior spiracle
Fig. 2. Paired pores.
Fig. 3. Marginal pores.
Fig. 4. Abdominal end.

Length of test—about 0.45 mm. Body—about 0.44 mm. Width of body—about 0.34 mm. Length of apical seta—about 0.05 mm. Tubular duct—about 0.019 mm. Diameter of anal ring—about 0.014 mm. Distance between apical setae—about 0.023 mm. Distance between marginal rows of paired and simple pores—about 0.008 mm. Distance between marginal single pores—about 0.0046 mm. Distance between spiracle and body margin—about 0.046 mm.

Host.—Bambusa stenostachya, attacking the lower side of the leaf.

Hab.—Taihoku, Nisui, Suisha; Naze (Amamioshima).

Very common in Formosa. Near to *Asterolecanium solenophoroides* Green, but is different in the shape of body or test, possessing dorsal paired pores, etc. Some of my specimens have been kindly examined by Dr. H. Morrison.

Asterolecanium pseudomiliaris Green, var.
bambusifoliae n. var.

(Adult female) Differs from the typical species in the following characters:

(1) Row of single marginal pores usually absent, and when present, not continuous, near the marginal paired pores.

(2) Larger paired pores on the dorsum very few, only about 4 or 5 pairs on the cephalothorax, 0–4 pairs in a longitudinal row on the abdomen, about 2 on the marginal area of abdomen.

Host.—Bambusa sp., attacking the lower side of the leaf.

Hab.—Nisui.

Many specimens were collected by the author in September and November, 1928.

Asterolecanium lanceolatum Green.

Asterolecanium lineare Green, Cocc. Ceylon, IV, p. 336 (1909).

A. lanceolatum Green, Cocc. Ceylon, IV, prefatory note (1909); V, p. 461 (1922).

A. sp., Takahashi, Trans. Nat. Hist. Soc. Formosa, XIX, p. 430 (1929).

Host.—Bambusa sp.

Hab.—Taihoku, Mako (Pescadores Islands).

Previously known from India and Ceylon. Sometimes occurs in large numbers at Taihoku.

Eriococcus transversus Green.

Cocc. Ceylon, V, p. 351 (1922).

Host.—Bambusa sp.

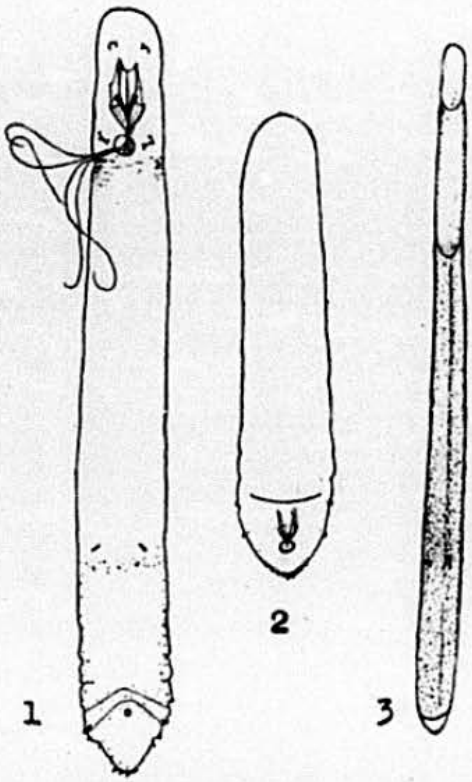
Hab.—Suisha.

A few females were collected by the author in May and October, 1929.

New to the fauna of Formosa.

Chionaspis vermiformis n. sp.

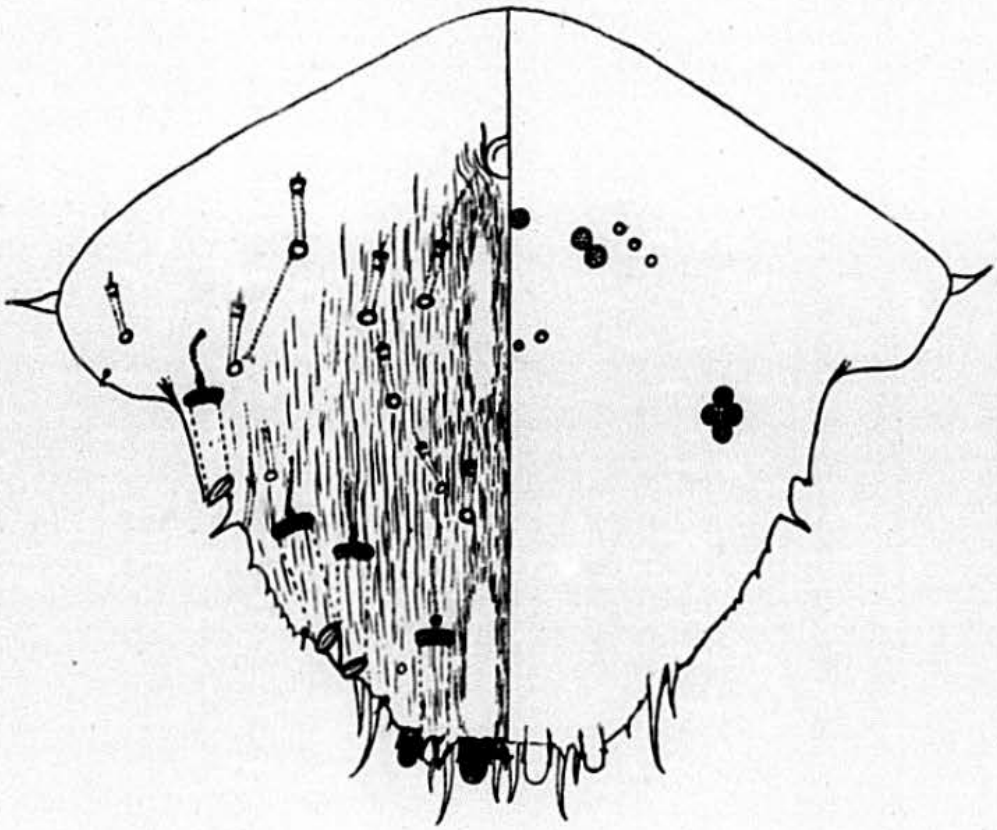
(Adult female) (Scale) Very long, narrow, almost straight, sometimes slightly widened towards the posterior portion, about 3.3 mm. in length. The 1st larval skin pale yellow or almost transparent, on the anterior extremity of scale or extending beyond it. The 2nd larval skin yellowish brown, much shorter than the body, slightly widened posteriorly, about 4 or 5 times as long as wide, about 0.8 mm. in length. Yellowish brown excretion occupying most of the scale, very narrowly black on the lateral margin, pale in colour on the posterior part, with a median longitudinal ridge.



Chionaspis vermiformis n. sp.
Fig. 1. Body of adult female.
Fig. 2. Second larval skin.
Fig. 3. Adult female.

(Body) Long, narrow, slightly widened towards the posterior portion, about 8 times as long as wide, transversely striate, with a few short setae on the head and about 7 minute glands on each side between the anterior and posterior spiracles; abdomen with about 17 glands behind the posterior spiracle and some ones on the side, the last 3 segments more or less defined, with many glands on the side; the last segment defined, wite some glands on the middle area, a rounded lateral protuberance on the hinh angle, 2 small spines on the anterior angle and a larger marginal gland on the lateral protuberance, this marginal gland almost as large as those on

the pygidium; the penultimate segment with some glands on the middle area and a rounded lateral protuberance near the hind end; the glands on abdomen excepting the large glands on the last segment similar in shape to the smaller tubular ducts on the pygidium, somewhat smaller anteriorly. Antennae more widely separated from each other than from the body margin, with a long stout curved seta which is slightly longer than the spiracle. Mouth parts normal. Anterior spiracles more widely separated from each other than from the body margin, with a pore near the distal



Chionaspis vermiformis n. sp.
Pygidium of adult female.

part, as large as the posterior ones; posterior spiracles situated behind the middle of body, without parastigmatic pores. Length of spiracle—about 0.014 mm.

(Pygidium) Somewhat wider than long, protruding on the side of the base.

Anal opening nearer to the base than the apex. Gland orifices scattered, about 20 in all. Circumgenital pores in 5 groups, median group—2 pores, upper lateral group—2, lower lateral group—4. Marginal glands large, 4 pairs. Gland spines

as shown in the figure. Lobes well developed, protruding, longer than wide, broadly rounded on the apex, with a minute process on the side, 2 pairs; median lobes parallel; the 2nd lobes smaller. (See the figure)

Length of body—about 1.4 mm.

Host.—Bambusa sp., attacking the upper side of the leaf.

Hab.—Suisha.

Many specimens were collected by the author in October and November 1929. This species resembles *Chionaspis annandalei* Green and *C. linearis* Green in the body shape, but differs from them remarkably in the characters of the 2nd larval skin and pygidium (see the figures).

Chionaspis bambusifoliae n. sp.

(Adult female) (Scale) Very long, narrow, straight or slightly curved, parallel-sided, moderately convex on the dorsum, rounded on the posterior extremity, without dorsal ridges, about 2.5 mm. in length. The 1st larval skin pale yellowish brown, extending beyond the anterior extremity of the 2nd larval skin. The 2nd larval skin pale yellowish brown, much shorter than half the length of the scale, broadly rounded on the anterior end, slightly broadened towards the posterior portion, tapering on the posterior end, about 4 times as long as wide, with 2 pairs of lateral spines near the pygidium, without distinct transverse furrows; pygidium with 4 pairs of large marginal glands and a pair of much smaller ones; about 0.8 mm, in length. White semitransparent secretion occupying most of the scale, somewhat extending out of the lateral margins of the 2nd larval skin.

Chionaspis bambusifoliae n. sp.

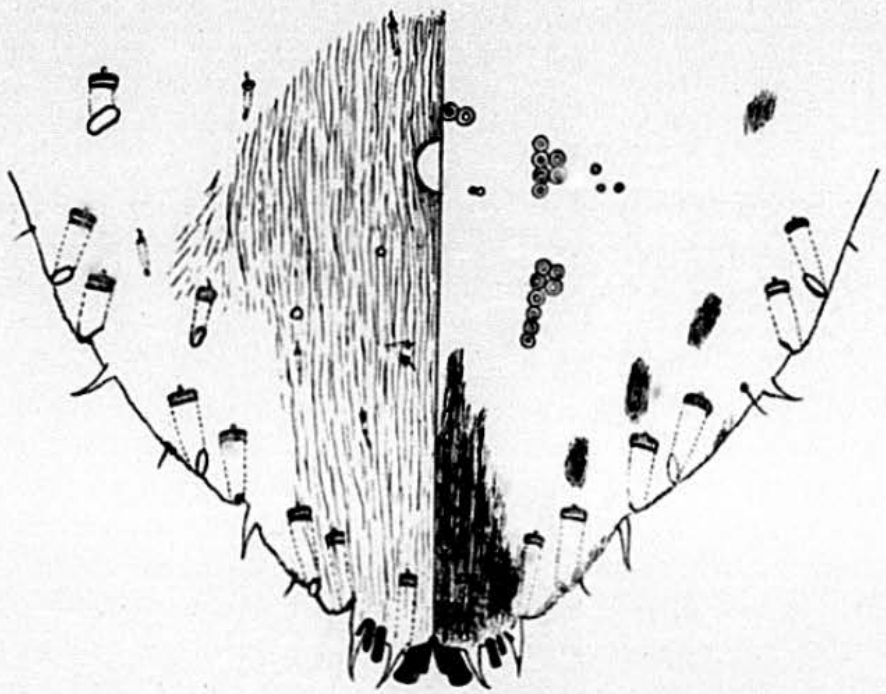
Fig. 1. Second larval skin.

Fig. 2. Marginal spine on abdomen of adult female.

(Body) Orange yellow, very elongate, narrow, almost parallel-sided, broadly rounded on the front, transversely striate between the posterior spiracles and the first free abdominal segment, about 6 times as long as wide; head with about 12 minute setae along the margin; abdomen with 3 short stout glands and about 6 minute glands on the side of the posterior part of the fused part; the last 3 segments defined, not protruding on the side, the anterior free segment with 3 spines, 2 short stout glands and 4 minute glands on the side, the middle free segment with 3 spines and 4 minute

glands on the side and about 5 similar minute glands in a transverse row on the middle, these marginal stout glands on these 2 free segments and on the posterior part of the fus l part somewhat longer than wide, widened on the distal part; the last free segment with 2 short marginal glands near the anterior corner which are similar to those on the pygidium, 2 or 3 spines and 3 or 4 minute glands on the side and about 7 minute glands in a transverse row on the middle; marginal spines on the free abdominal segments stouter than those on the pygidium, abruptly widened on the basal half, and the marginal minute glands connecting with the spines. Antennae a little nearer to the front margin than to the mouth part, rather close to each other (about 0.02 mm. between the antennae), with a stout slightly curved seta which is about 0.014 mm. in length. Spiracles more widely separated from each other than from the body margin; anterior spiracles with a parastigmatic pore, the posterior ones somewhat stouter, situated behind the middle of body, lacking parastigmatic pores.

(Pygidium) Tapering, a little wider than long. Anal opening much larger than the circumgenital pore, nearer to the base than to the apex. Circumgenital pores in 5 groups, median group with 3 or 4 pores, upper lateral with 5 or 6, lower



Chionaspis bambusifoliae n. sp.
Pygidium of adult female.

lateral with 8. 7 pairs of marginal glands, a pair of smaller submarginal glands which are usually absent, a pair of glands near anterior margin, and a few minute glands; the glands near the anterior margin similar in shape to the marginal ones; the posterior pair of the marginal glands more slender. Gland spines 4 on each side, of which the anterior 2 are usually larger. Median lobes prominent, somewhat divergent, broad, slightly rounded at the distal margin, not serrate, emarginate on the inner edge; the 1st lateral lobes minute, duplex, the inner lobule prominent, squarely cut at the end; other lobes wanting. Dorsal surface more chitinized, with many longitudinal lines on the median part and 2 pairs of very small circular pores behind the anal opening.

Length of body—about 1.3 mm.

Host.—Bambusa sp., attacking the upper side of the leaf.

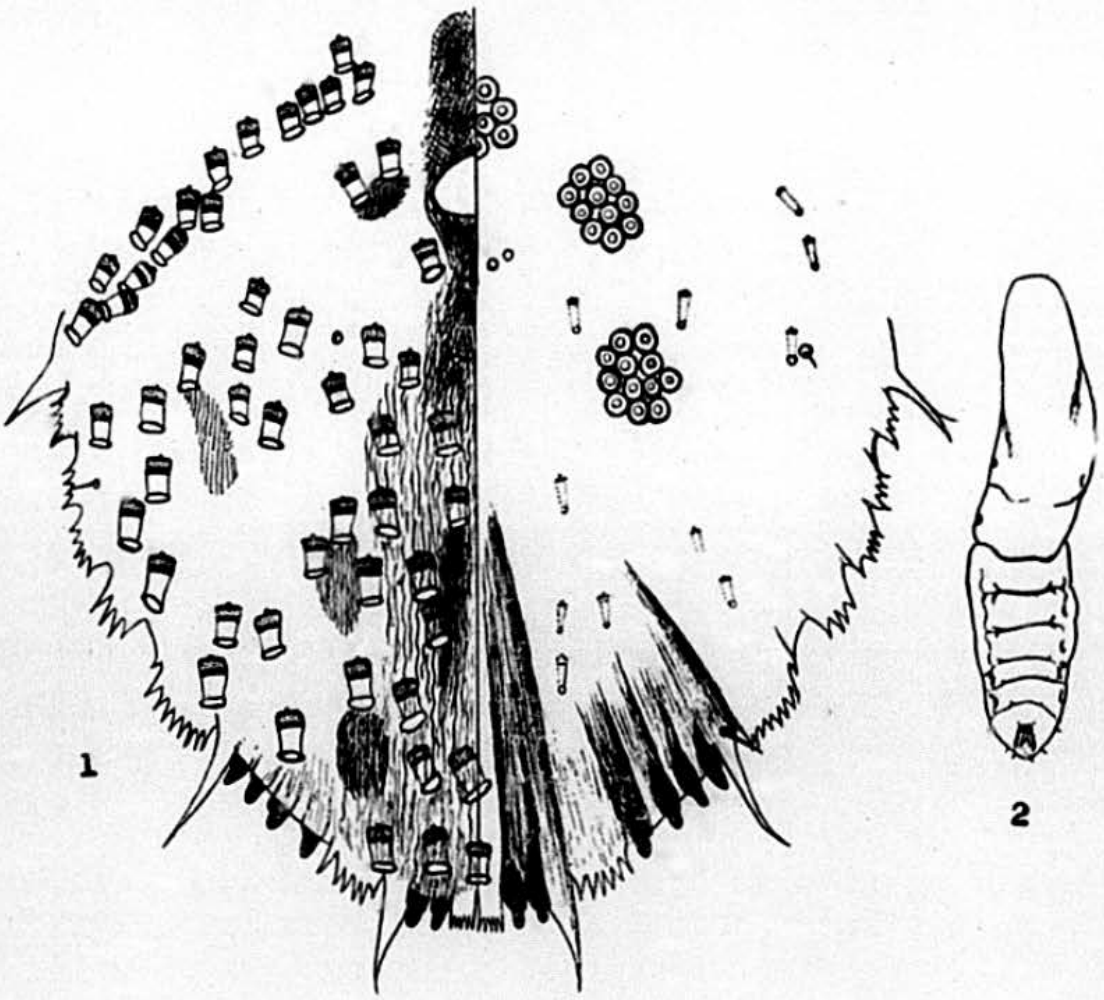
Hab.—Suisha, Taihoku.

This species is very common in Taihoku and the above description was made from specimens collected by me at Taihoku in January 1930. Closely allied to *Chionaspis elongata* Green, but is easily distinguished from it by the following characters: (1) Free abdominal segments not protruding laterally. (2) Pygidium with fewer gland orifices. (3) Pygidium with fewer gland spines. (4) Marginal spines on the free abdominal segments abruptly broadened on the base. (5) Median lobes broad on the distal part.

Tsukushiaspis suishanus n. sp.

(Adult female) (Scale) Elongate, convex on the dorsum, usually curved, about 0.85 mm.—1.0 mm. in length. The 1st larval skin blackish brown, yellow on the posterior marginal area, shining, slightly or scarcely extending beyond the anterior end of the 2nd larval skin. The 2nd larval skin blackish brown, covered with thin gray secretion on the dorsal side, elongate, broadest about the middle, about 4–4.5 times as long as wide, about twice as long as the 1st larval skin, usually curved, with a distinct transverse furrow a little behind midlength, about 5 transverse furrows on the posterior part, and 3 pairs of marginal glands on the pygidium, about 0.85–1.0 mm. in length. No secretion behind the 2nd larval skin nor beyond the lateral margins.

(Body) Elongate, about 4 times as long as wide, somewhat curved, broadest on the middle part, slightly narrowed towards both ends, somewhat more chitinized from the anterior spiracles to behind the posterior ones; head with a few minute marginal setae, rounded on the front; thorax with some minute glands behind the anterior spiracles and a few similar ones behind the posterior ones; the last 3 abdominal



Tsukushiaspis suishanus n. sp.

Fig. 1. Pygidium of adult female. Fig. 2. Second larval skin.

segments defined, not protruding on the side, each with many short stout glands and 2 small setae on the side and about 7–10 similar glands in a single row on the lateral part of the hind margin; these glands similar to those on the pygidium, but somewhat smaller; the remaining part of abdomen with many small glands on the lateral area and in a transverse cluster on the anterior part and a few very short truncate marginal setae, these glands of 2 types, those on the outer parts and in the transverse cluster similar to those on the defined segments, but somewhat smaller, and those on the inner parts much smaller, slender. Antennae a little nearer to the mouth part than to the front margin, almost as widely separated from each other as from the

lateral margin of body, with 2 long somewhat curved setae, of which one is slightly longer and stouter, about 0.0185 mm. in length; distance between antennae about 0.032 mm. Anterior spiracles more narrowly separated from each other than from the lateral margin, with 3 parastigmatic pores; posterior spiracles as large as the anterior, situated in front of midlength of body, without parastigmatic pores.

(Pygidium) Slightly longer than wide, not broad on the tip, more chitinized and with many longitudinal wavy lines on the median part of dorsum. Anal opening much nearer to the base than to the tip, much larger than the circumgenital pore. Circumgenital pores in 5 groups, median group with 9 or 10 pores, upper lateral with 10–12, lower lateral with 10 or 11. Numerous short stout glands opening on the dorsum, with oval orifices, almost equal in diameter to the cirumgenital pore. A median and about 8 pairs of marginal glands a little longer than wide, similar to those opening on the dorsum. Some minute slender glands on the venter. Median lobes small, projecting, widely separated, slightly divergent or almost parallel, usually with a notch on each edge near the base, more or less pointed or rounded at the apex, tapering, longer than wide, shorter than the marginal gland. 4 similar lateral lobes arranged approximately to each other on the side which are variable in size; a similar lobe sometimes present near the median lobe. 2 short wide furcated plates between the median lobes, as long as or slightly longer than the lobe; a similar but wider plate between the median and 2nd lobes which is as long as the 2nd lobe; about 5 similar plates on each side outside of the last lobe. Gland spines 3 on each side, long, much longer than the lobe, about 0.014 mm. in length; a few shorter marginal setae.

Length of body—about 0.85 mm.

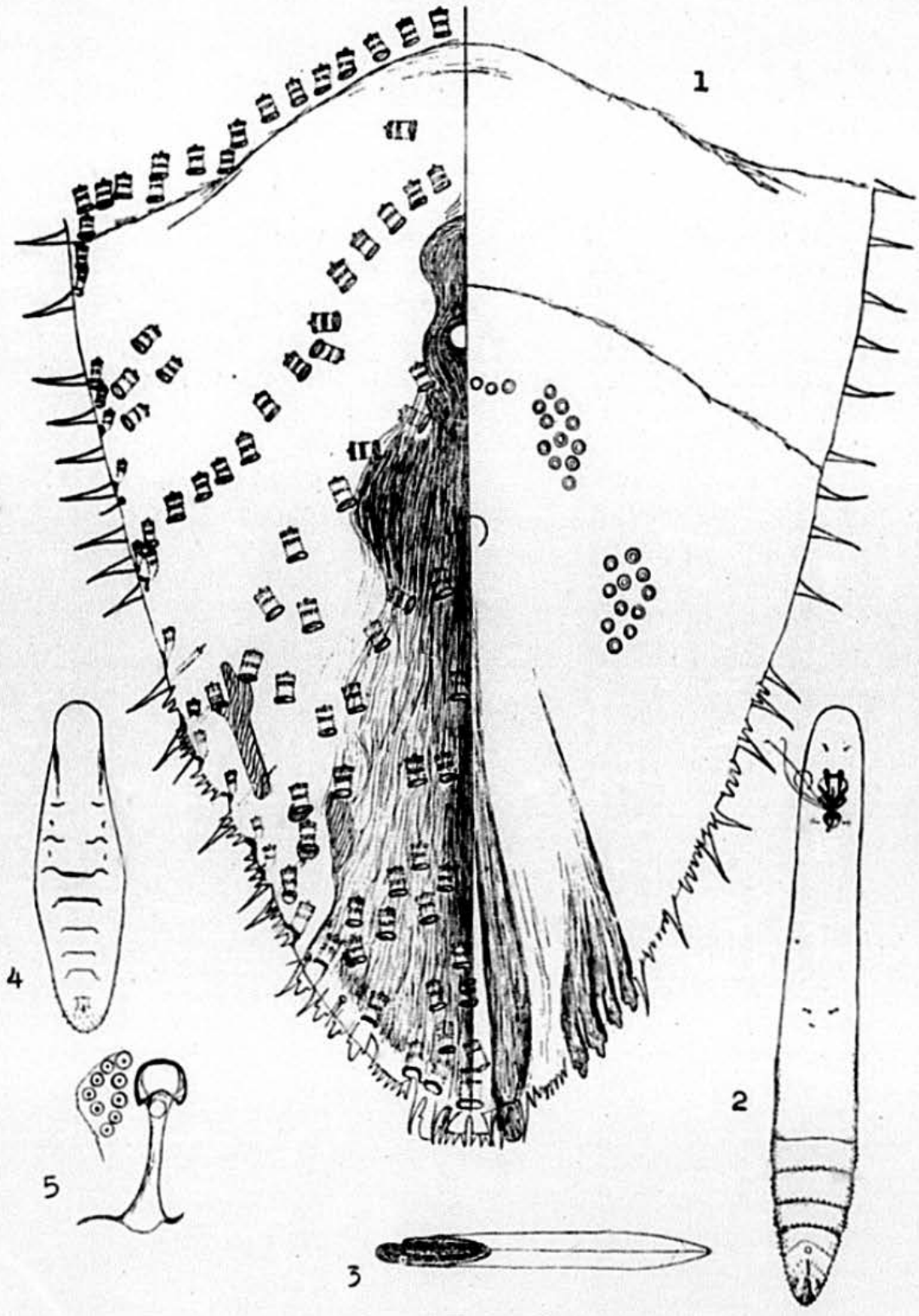
Host.—Bambusa ap., attacking the basal part of the upper side, along the midrib, of the leaf.

Hab.—Suisha.

Some specimens were collected by the author on November 2, 1929. This species is different from any known species of the genus in lacking secretion behind the 2nd larval skin of the scale.

Tsukushiaspis elongata n. sp.

(Adult female) (Scale) Very elongate, slender, straight or somewhat curved, almost parallel-sided, but sometimes slightly broadened behind the middle, tapering on the posterior portion, roof-like on the dorsum sloping rather abruptly from the dorso-median line to the lateral margins, with no ridge, closed by white secretion on the venter; about 3.0–3.5 mm. in length. The 1st larval skin yellowish brown to



Tsukushiaspis elongata n. sp.

Fig. 1. Pygidium of adult female.
Fig. 2. Adult female.
Fig. 3. Scale of adult female.
Fig. 4. Second larval skin.
Fig. 5. Anterior spiracle.

dusky, located at the anterior extremity, extending beyond the 2nd larval skin. The 2nd larval skin mostly black, yellowish brown on the marginal area, whitish on the middle longitudinally, shorter than half the length of the scale, much shorter than the body, about 1.0 mm. in length. Grayish white secretion occupying most of the scale, slightly extending beyond the lateral margins of the 2nd larval skin.

(Body) Very elongate, slender, somewhat widened behind the middle, slightly tapering towards the anterior end which is rounded, with numerous marginal glands on the posterior portion; the last 3 segments well defined, not protruding laterally, each with numerous glands arranged in a transverse row on the hind margin and many lateral gland spines; these glands and spines similar to those on the pygidium, waning on the anterior part of body. Mouth parts not very large. Antennae separated as far from each other as from the lateral margin, with 2 long stout somewhat curved setae which are slightly shorter than the spiracle. Spiracles equal in length, anterior spiracles with about 9 parastigmatic pores, posterior spiracles stouter, located at about midlength of body, lacking parastigmatic pores, about 0.02 mm. in length.

(Pygidium) Longer than wide, longer than the last 2 free abdominal segments taken together, tapering. Anal opening nearer to the base than to the apex, almost circular. Dorsum strongly chitinized around the anal opening and on the median area which is provided with many wavy lines; a few small chitinized areas with wavy lines on the submarginal area; gland orifices numerous, more or less arranged in rows as shown in the figure. Circumgenital pores in 5 loose clusters, median group with 6 pores, upper lateral with 9–11, lower lateral with 10–12. 3–5 pairs of lobes: median lobes broad, somewhat divergent, protruding, broadly rounded at the apex, with a notch on each side, longer than wide, as long as the distal gland spines; the 2nd, 3rd, 4th and 5th lobes arranged near each other, equal in size, almost similar in shape to the median lobes, but smaller, shorter than the gland spines, more or less pointed at the tip; these lateral lobes sometimes only 2 or 3 pairs. A pair of trifurcated plates between the median lobes wide, parallel, as long as the lobes. A wide very short plate with about 6 or 7 short spine-like processes on the distal margin between the median and the 2nd lobes, 6 rows of similar spine-like processes outside of the last lobe. Gland spines and marginal glands as shown in the figure.

Length of body.—about 2.2 mm.

Host.—Bambusa sp., attacking the upper surface of the leaf.

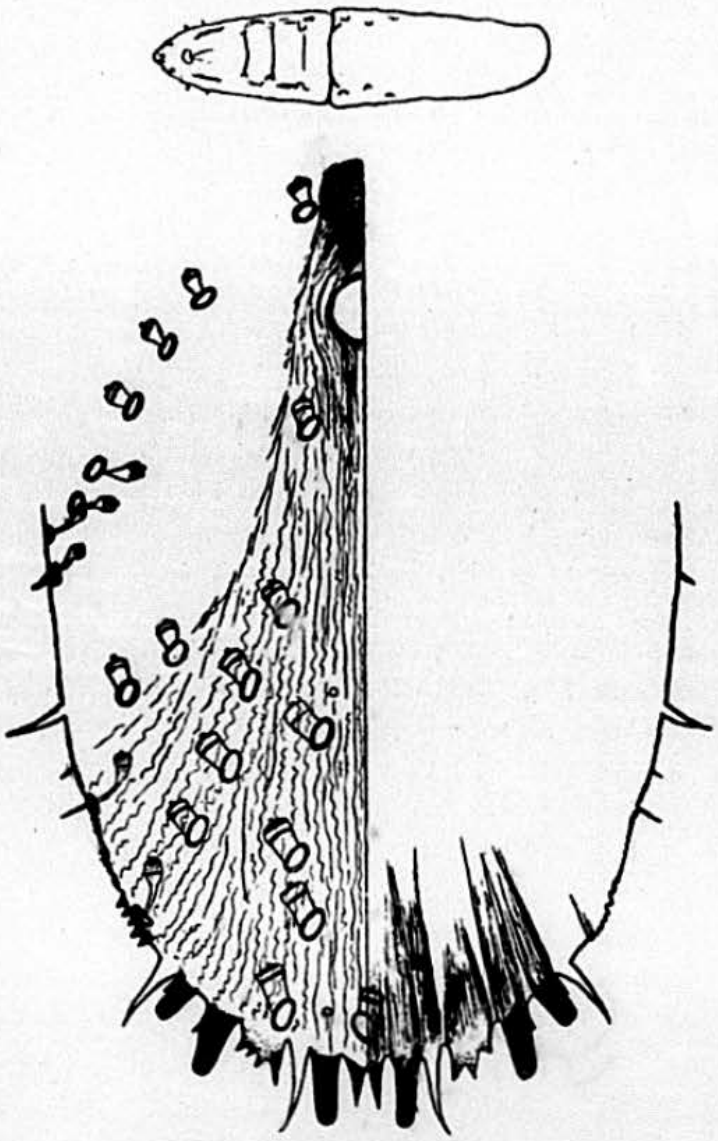
Hab.—Suisha.

Many specimens were collected by the author in October 1929. This species is related to *Tsukushiaspis hikosani* Kuw., but is easily distinguished from it by the shape of the lobes on the pygidium.

Tsukushiaspis neolinearis n. sp.

(Adult female) (Scale) Very long, narrow, straight or somewhat curved, convex on the dorsum, with no dorsal ridge, about 1.8–2.0 mm. in length. The 1st larval skin almost white, pale brownish on the middle area, scarcely extending beyond the anterior extremity of the 2nd larval skin. The 2nd larval skin pale whitish brown, broadest about the middle, rounded on both ends, somewhat curved, about 4 times as long as wide, much shorter than the excretion, about 1.6 times as long as the 1st larval skin, with a distinct transverse furrow a little behind the middle and about 5 transverse furrows on the posterior portion, about 0.7 mm. in length. White secretion occupying most of the scale, not extending out of the lateral margins of the 2nd larval skin, with 2 or 3 slight concaves on the side.

(Body) Elongate, about 6.5–7 times as long as wide, almost parallel on the sides, rounded on the front; the last 3 abdominal segments somewhat defined, not convex nor protruding on the side, with no marginal spines; each free segment with 5–7 glands



Tsukushiaspis neolinearis n. sp.
Second larval skin and pygidium of adult.

in a transverse row on the lateral part of the posterior margin and 2 or 3 similar glands on the side which are similar to those on the pygidium; basal part of abdomen with 4 transverse rows of glands on the side, the first row with about 7 glands in a row, the 2nd row with about 14 glands in a loose cluster reaching the median area of body, the 3rd row with about 4 glands in a row, the 4th row with about 11 glands in a cluster; these glands somewhat smaller than those on the free segments; head with a few minute setae. Antennae somewhat nearer to the mouth part than to the front margin, more narrowly separated from each other than from the lateral margin, with a long stout somewhat curved seta which is about 0.019 mm. in length; distance between antennae about 0.019 mm. Anterior spiracles more widely separated from each other than from the lateral margin, with a parastigmatic pore, posterior spiracles as long as the anterior, at about midlength of body, lacking parastigmatic pores.

(Pygidium) Longer than wide, rounded on the hind margin, somewhat more chitinized and with many longitudinal wavy lines on the median part. Anal opening near the base, large. Circumgenital pores wanting. A median gland and 5 pairs of marginal glands, median gland short, stout, shorter than the median lobe, but a little longer than wide; dorsal glands about 30 in all, similar to the median one, arranged in rows. Median lobes long, narrow, projecting, somewhat expanded at the base, parallel on the sides, somewhat rounded on the distal margin, much longer than wide, heavily chitinized, not serrate on the edge, widely separated from each other, parallel or somewhat divergent. 2 lateral lobes on each side approximate to each other, the inner lobe similar in shape to, but somewhat shorter than the median lobe, sometimes with one or 2 minute spines on the side; the outer lobe shorter than the inner one, almost conical, rounded at the tip. A process between the median lobes divided on the distal half,* sharply pointed, shorter than the median lobes; a trifurcated plate between the median and the 2nd lobes, a small shorter furcated plate outside of the last lobe. 3 or 4 gland spines on each side somewhat longer than the median lobe, rather slender; 2 or 3 marginal bristles on each side.

Length of body.—about 1.0–1.2 mm.

Host.—Bambusa sp., attacking the lower side of the leaf.

Hab.—Suisha, Taihoku.

Common near Taihoku. The above description was made from specimens collected by the author on October 2, 1929 at Suisha. This species is different from the known species of the genus in the shape of lobes and in lacking circumgenital pores.

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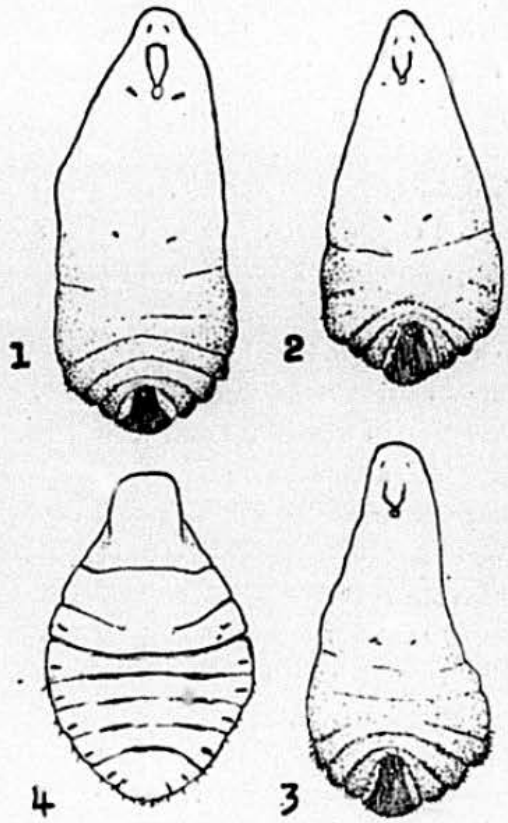
* Sometimes very deeply divided (See the figure).

Tsukushiaspis formosanus n. sp.

(Adult female) (Scale) Flattened, moderately convex on the dorsum, narrowed towards the front, rounded on the posterior margin, without dorsal ridges, about 2.3 mm. in length. The 1st larval skin yellowish brown, yellow on the posterior marginal area, situated on or slightly extending beyond the anterior end of the 2nd larval skin. The 2nd larval skin blackish brown, brown on the posterior marginal area, much shorter than half the length of the scale, broad, broadest about the middle, narrowed on the anterior portion, broadly rounded on the front margin, about 1.6 or 1.7 times as long as wide, covered with white secretion on the dorsum, with distinct segmentation, and a distinct transverse furrow about the middle, about 0.9 mm. in length. Secretion greyish white, thick, occupying most of the scale, extending out of the lateral margins of the 2nd larval skin.



Tsukushiaspis formosanus n. sp.
Figs. 1–3. Body of adult female.
Fig. 4. Second larval skin.

(Body) Flattened, broadest on the abdomen, gradually narrowed towards the front, abruptly narrowed towards the posterior end, about 2–2.4 times as long as wide, variable in shape as shown in the fugures; head with a few minute marginal setae; abdomen with numerous small glands on the lateral areas, many minute slender glands on the submarginal areas of the basal segments, some similar minute ones on the middle area, and some very small pointed conical spines each connecting with a slender minute gland mostly on the submarginal areas of venter of the basal part; basal segments somewhat defined; the last 3 segments well defined, each protruding and with many very long spines and some short more or less pointed processes, some of which are bifurcated, on the side, and many small glands along the posterior margin except on the middle; all these small glands on the abdomen similar in shape

and size to those on the pygidium. Antennae far separated from each other, with 2 or 3 long stout curved setae. Anterior spiracles somewhat more widely separated from each other than from the lateral margin, with about 18 parastigmatic pores in a very dense group; posterior spiracles at about midlength of body, almost as far separated from each other as from the body margin, as long as the anterior, without pores.

(Pygidium) Somewhat longer than wide, but as long as wide in some specimens, a little extending beyond the last free segment, broadly rounded on the posterior margin, more chitinized on the dorsal median area which is with many longitudinal wavy lines, narrowly more chitinized on the middle part of the posterior margin. Anal opening much nearer to the base than to the apex, much larger than the circumgenital pore, strongly chitinized along the margin. Circumgenital pores somewhat smaller than the dorsal gland orifice, in 5 large groups, median group with 18–22 pores, upper lateral with about 31–42, lower lateral with about 22–31. Dorsal gland orifices numerous, more or less arranged in about 3 or 4 pairs of rows, a few of these glands anterior to the anal opening; marginal glands small, simiar in shape and size to the dorsal ones, about 25 in number in all; some very small slender glands opening on the venter. Median lobes distinct, protruding, somewhat longer than wide, nearly as long as the marginal gland, broadly rounded on the apical margin, scarcely serrate on the edge, widely separated, parallel, with a minute process on the side; 2 similar lobes on each side near the median lobes, the outer one a little smaller. 2 bi- or trifurcated plates between the median lobes somewhat shorter and much more narrow than the lobe, a little longer than wide, sometimes not furcated; a wider furcated plate between the median and the 2nd lobes, about 6 similar plates outside of the last lobe on each side almost as wide as the lobe. Gland spines long, slender, much longer than the median lobe, about 10 on each side, about 0.028 mm. in length.

Length of body—about 1.4–1.7 mm. in length.

Host.—Bambusa sp., attacking the stalk under the sheath.

Hab.—Suisha.

Some specimens were collected by the author on November 23, 1929, and Jan. 26, 1930. This species is allied to *Tsukushiaspis bambusae* Kuw. (*T. pseudoleucaspis* Kuw.), but is easily distinguishable from it by the stouter body, possessing more marginal spines on the pygidium and more circumgenital pores, etc. Somewhat resembles *Nikkoaspis* in the shape of body.

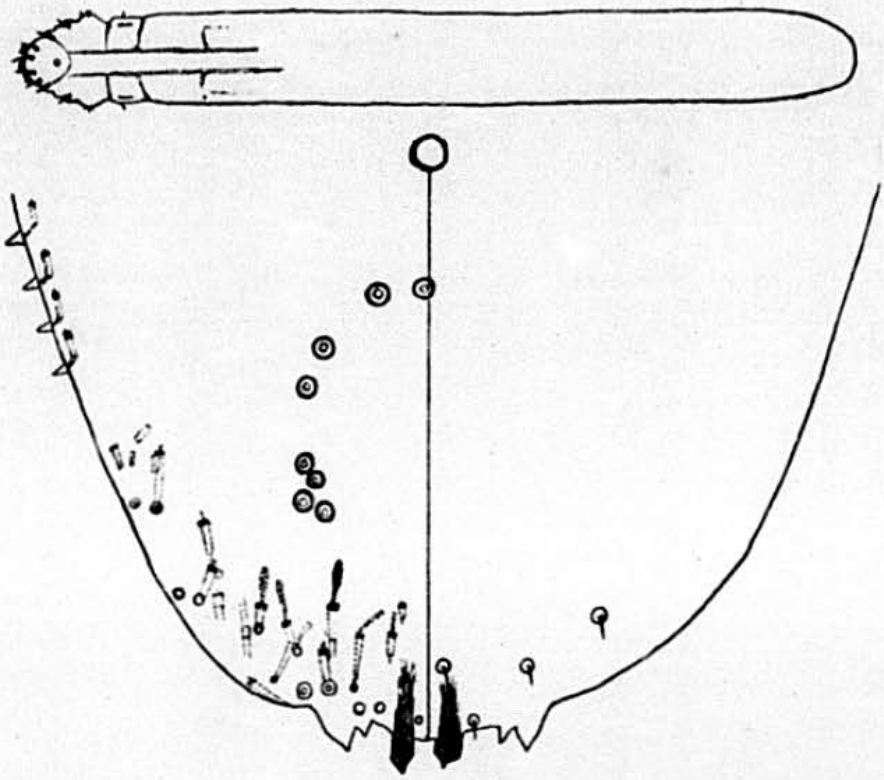
In Formosa there are another 2 new species of *Tsukushiaspis*, one of which is abundant on various bamboos and the other on Phragmites sp. The former species is allies to *Tsukushiaspis hikosani* Kuw., differing in the shorter lobes, and its scale very closely resembles that of *T. neolinearis* Takah. The other species on Phragmites

sp. has very short furcated plates and lobes on the pygidium. The specimens of them were sent to Dr. I. Kuwana years ago.

Lepidosaphe[illegible]es Lindinger (Inst. angew. Bot., Hamburg, Jahresbericht, 1929, p. 106, 1930) is a synonym of *Tsukushiaspis*. The species recorded as *Chionaspis annandalei* Green from Formosa by Ferris (Bull. Ent. Res., XII, p. 213) may be a *Tsukushiaspis*. I have never collected *C. annandalei* Green in our island.

Protodiaspis nigra n. sp.

(Adult female) (Scale) Very long, narrow. The 1st larval skin pale yellowish brown, extending beyond the anterior end of the 2nd larval skin. The 2nd larval skin black (black even in specimens treated with potash), covering most of the scale, elongate, very narrow, almost straight, but sometimes very slightly curved, parallel-sided, thick, moderately convex on the dorsum, about 8.5–9.2 times as long as wide,



Protodiaspis nigra n. sp.
Second larval skin and pygidium of adult female.

with no distinct ridge, closed by thin secretion ventrally, about 1.6 mm. in length. Secretion pale white, almost transparent, slightly extending out of the posterior end of the 2n larval skin. Length of scale about 1.75 mm.

(Body) Elongate, parallel-sided, rounded on both ends (the anterior end sometimes more narrow), about 5.5-6 times as long as wide; thorax with about 10 minute glands in a longitudinal row along the side between the anterior and posterior spiracles and many similar glands in a large cluster around the posterior spiracles; abdomen with some similar glands arranged nearly in a row on the side; these glands almost similar to those on the pygidium; the last 3 abdominal segments somewhat defined, but not protruding laterally. Antennae near the anterior margin, almost as widely separated from each other as from the lateral margin, with a very slightly curved stout seta which is about 0.0095 mm. in length. Anterior spiracles more w ely separated from each other than from the lateral margin, with a small parastigmatic pore near the distal end; the posterior ones behind midlength of body, slightly larger than the anterior, with no pores. Mouth part normal.

(Pygidium) Somewhat wider than long, simple on the margin. Anal opening nearer to the base than to the apex, rather small, but larger than the circumgenital pore. Circumgenital pores in 5 groups, median group with 2 pores, upper lateral with 2 or 3, lower lateral with 3-5 in a row or in a loose cluster. Some very small glands on the submarginal area, especially on the posterior portin, large marginal glands wanting. Median lobes parallel, protruding, more or less pointed at the tip, almost as long as or a little longer than wide, with a minute notch on the side; a conical pointed lobe on each side often divided. About 9? very small conical gland spines on the lateral margin, which are easily removed and can not be fully counted in my specimens.

Length of body—about 0.9 mm.

Host.—Bambusa sp., attacking the upper side of the leaf.

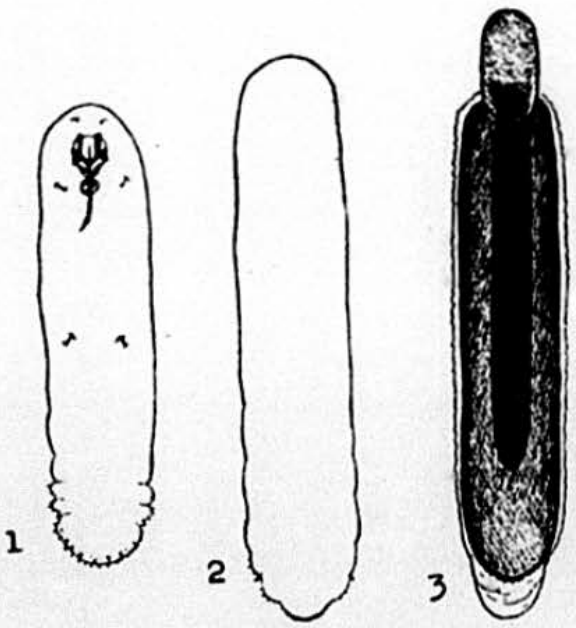
Hab.—Suisha.

This species is very common at Suisha and the above description was made from specimens collected in November 1929 by the author.

Leucaspis bambusicola n. sp.

(Adult female) (Scale) Elongate, straight, parallel-sided, flattened, about 2.2 mm. in length. The 1st larval skin pale yellowish brown, somewhat dark greenish on the posterior portion, placed at the anterior extremity of the scale, extending

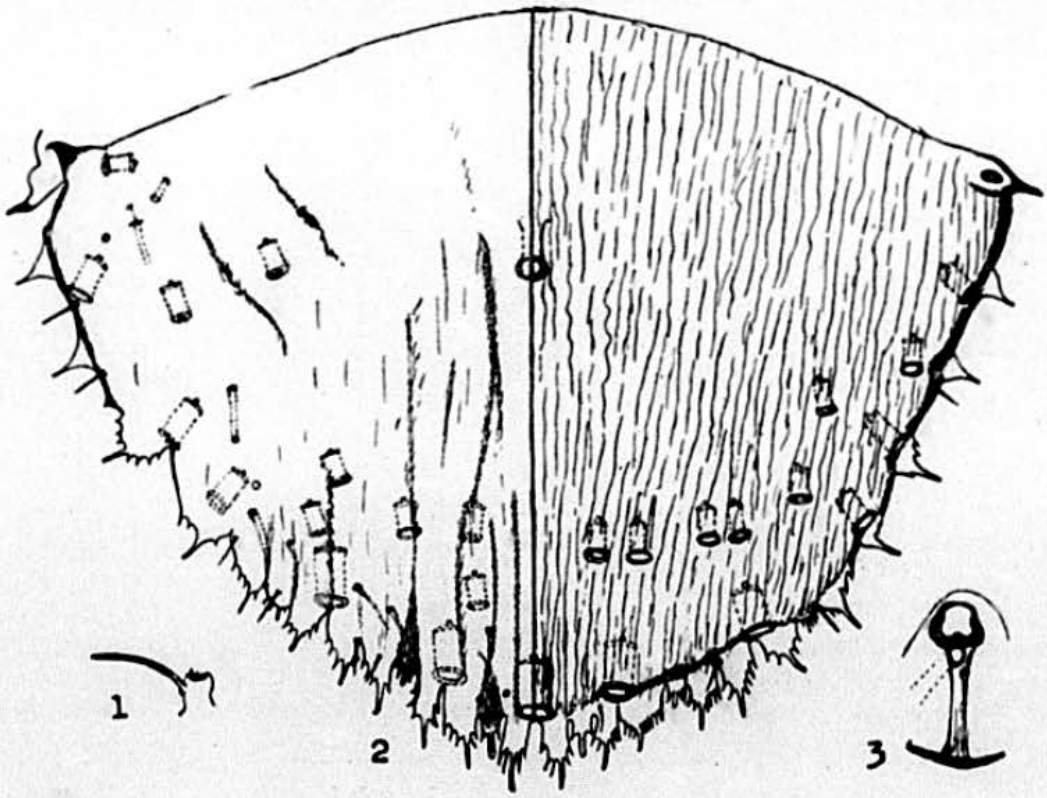
beyond the 2nd larval skin or in front of it. The 2nd larval skin broadly yellowish brown on the marginal area, longitudinally dark green on the middle, elongate, broadly rounded on both ends, sometimes slightly widened posteriorly, a little longer than the body, covering most the scale, closed by thin semitransparent greyish white secretion on the lower side, about 1.6 mm. in length. Thin semitransparent greyish white secretion extending a little beyond the posterior end of the 2nd larval skin and slightly beyond the lateral margins of it.



Leucaspis bambusicola n. sp.
Fig. 1. Body of adult female.
Fig. 2. Second larval skin.
Fig. 3. Scale of adult female.

(Body) Enclosed within the 2nd larval skin, located in the anterior part of it, elongate, rounded on both ends, not narrowed posteriorly nor anteriorly, parallel-sided, about 4 times as long as wide, with very few very small slender spinnerets scattered and a few very short marginal glands, and many ventral transverse irregular rows of minute spinules between the anterior spiracles; the last 2 abdominal segments defined, somewhat convex on the side, each with 3 or 4 gland spines which are expanded basally and 2 marginal glands on the side. Antennae with a long stout somewhat curved bristle which is about 0.02 mm. in length and 2 minute spikes. Spiracles equal in length, somewhat longer than the antennal bristle, the anterior ones with 4 or 5 parastigmatic pores, the posterior located at about midlength of body, lacking pores.

(Pygidium) Wider than long, rounded, not heavily chitinized. Anal opening nearer to the base than to the apex. Circumgenital pores wanting. 2 pairs of small lobes distinct; median lobes almost parallel, produced into a papilla on the distal part, with a short pointed process on each side; the 2nd lobes similar in shape to the median, but smaller; the 3rd rudimentary. 2 fringed plates between the median lobes slightly divergent, longer than the median lobes; 2 fringed plates between the median



Leucaspis bambusicola n. sp.

Fig. 1. Antenna. Fig. 2. Pygidium of adult female.
Fig. 3. Posterior spiracle.

and the 2nd lobes; 3 fringed plates between the 2nd and 3rd lobes, 3 fringed plates and 2 gland spines which are expanded basally cephalad of the 3rd lobe; and a chitinized spine at the base; all these fringed plates wide, produced into a slender eminent papilla on the distal end which is not pointed at the tip. Marginal glands 13 (including a median one) in number in all, of which the posterior 5 are larger; 14 dorsal gland orifices with thickened edges and a few slender spinnerets; distribution of the dorsal gland orifices sometimes asymmetrical.

Length of body—about 1.22 mm.

Host.—Bambusa sp., attacking the leaf.

Hab.—Suisha.

Very common near Suisha. The above description was prepared from specimens collected by me on October 2, 1929.

This species is not a typical *Leucaspis*, being peculiar in the characters of the pygidium, closely resembling *Parlatoria*, but now I place it in the genus.

Odonaspis simplex Green, var.
formosana n. var.

Differs fro the typical species in the following characters of the adult female:

(1) Pygidium somewhat wider, often less indented on the margin.

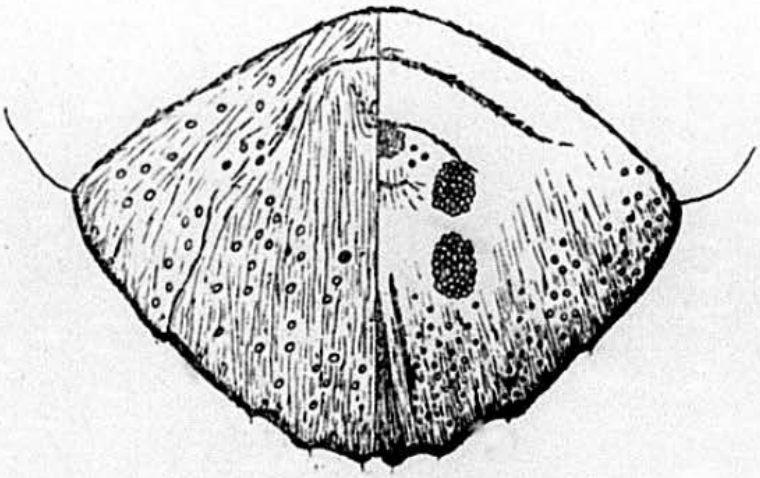
(2) Circumgenital pores in 5 groups.

(3) Anterior spiracles with 7–10 parastigmatic pores.

Host.—Dendrocalamus latiflorus, Bambusa stenostachya, Bambusa sp.

Hab.—Taihoku, Maruyama.

Very common near Taihoku. This variety may be the same with *Chionaspis simplex* Green, var. recorded by Brain from Natal (Bull. Ent. Res., X, p. 96).



Odonaspis simplex Green, var. *formosana* n. var.
Pygidium of adult female.

Certain new or little-known Formosan Coccidae.

Lecaniodrosicha n. genus.

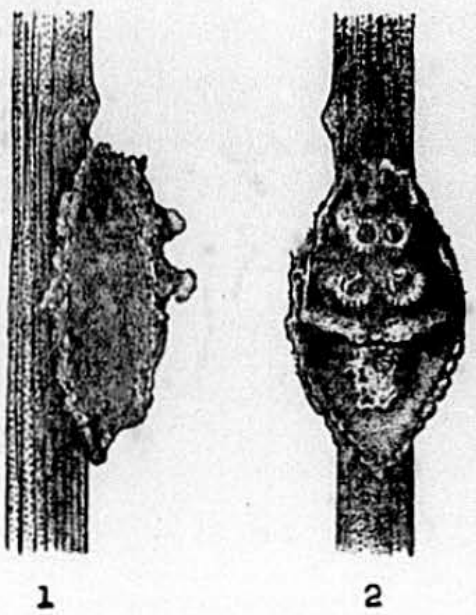
(Adult female) Body chitinized, but not strongly, covered with hard secretion not separable from the skin, excavated longitudinally on the venter, with transverse ridges on the dorsum, firmly cemented to the host. Derm with many stout setae and disk pores. Antennae 11-jointed, not placed close together. Rostrum 1-jointed. Legs well developed, tarsi 1-jointed, without capitate digitules. A ventral cicatrix present. Anal tube developed, with pores on the inner end, opening on the dorsum. Abdomen with 7 pairs of spiracles ? on the dorsum.

Genotype.—*Lecaniodrosicha lithocarpi* n. sp.

Related to *Aspidoproctus* Newst. and its allies, but differs from them in possessing dorsal transverse ridges.

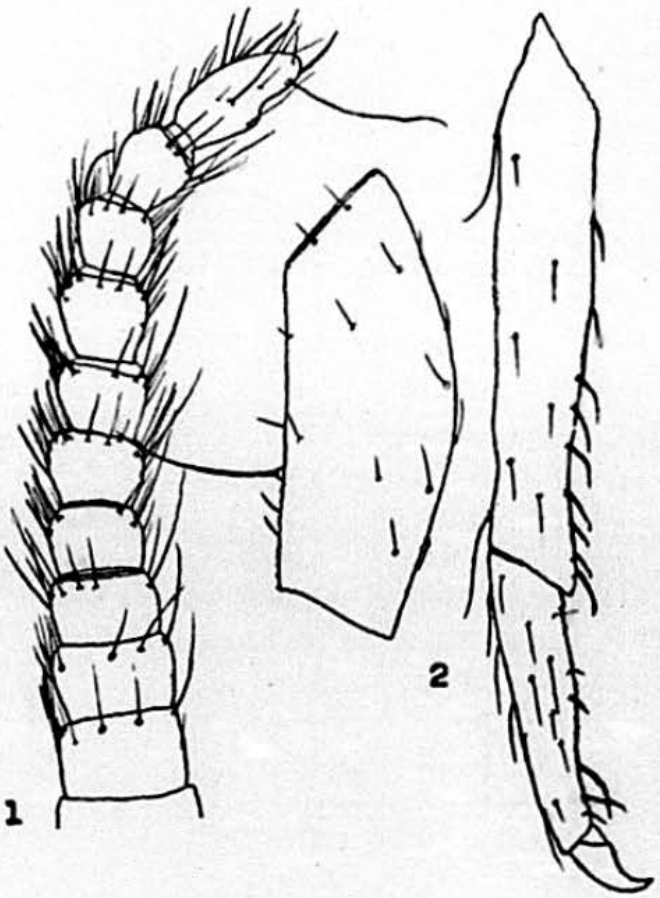
Lecaniodrosicha lithocarpi n. sp.

(Adult female) Body except on the middle area of the venter of abdomen entirely covered with thin, hard, pale brownish gary secretion which is rough on the surface, not separable from the skin, with some short white thin wax filaments on the dorsum; dorsum broadest about the middle, narrowed towards the posterior end, abruptly sloping to the venter on the anterior end, convex on the middle of the anterior half which is furnished with 2 distinct transverse ridges, each of which is provided with a pair of small blunt tubercles at the middle, the posterior ridge larger, reaching the lateral margins of the dorsal side, a pair of similar tubercles present in front of and behind the ridges; marginal area of dorsum except on the posterior end somewhat elevated and protruding, with very short small blunt tubercles of secretion; venter longitudinally and deeply excavated, narrower than the dorsum, firmly cemented to the host; lateral sides somewhat converging towards the venter, with many linear shallow reticulate crevices on the secretion. Body except on the middle area of abdominal venter densely covered with rather stout a little capitate setae which are equal in length, somewhat curved, somewhat expanded on the basal part, about 0.065 mm. in length, those on the venter of cephalothorax somewhat pointed at the tip; some very long fine somewhat curved bristles on the anterior and posterior portions; numerous very long fine hairs expanded a little at the base on the venter of cephalothorax. Antennae stout, not placed together, nearer to each other than to the front margin of body, as long as the front tibia and tarsus taken together, 11-jointed, somewhat tapering, with many long bristles; the 2nd and the following 8 joints each



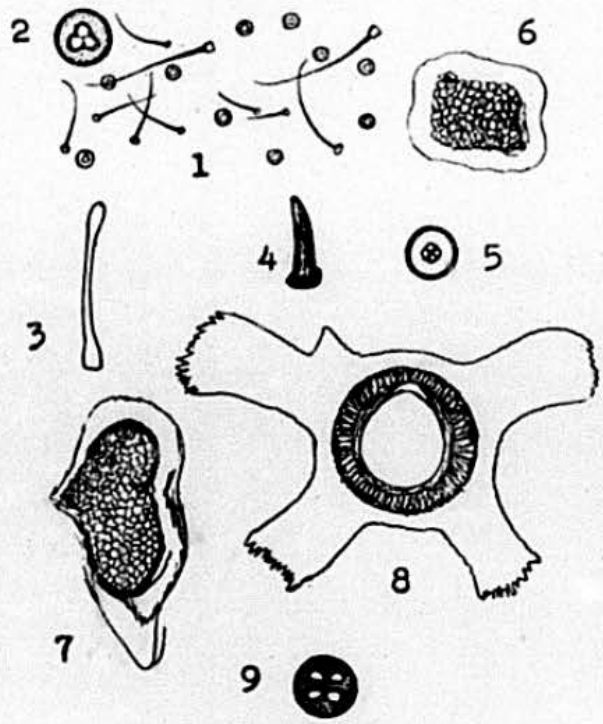
Lecaniodrosicha lithocarpi n. sp.
(Adult female)
Fig. 1. Lateral view.
Fig. 2. Dorsal view.

with a few very stout somewhat curved long setae arising from the distal part; the 1st joint much wider than the 2nd, short; the basal 9 joints wider than long; the 4th somewhat rounded on the side; the 5th and the following rounded on the side, narrowed towards the base; the 10th almost as long as wide; the 11th the longest, as long as the 9th and 10th taken together, about twice as long as wide, broadest about the middle, rounded at the tip, with some stouter bristles; the relative length of joints about as follows: I—12, II—20, III—20, IV—15, V—15, VI—17, VII—18, VIII—19, IX—18, X—18, XI—35. Rostrum very short, small, rounded at the tip, wider than long, not jointed, with many long stout setae. Eyes laterad of and near the antennae. Legs well developed, with many setae; coxae normal; trochanters well defined, with a few very small pores and a very much longer bristle on the distal port; femora stout, swollen, with a very long bristle about the middle of the posterior side, hind femora about 2.8 times as long as wide; tibiae somewhat swollen on the basal half and the distal part, with some much stouter setae along the mesal side, hind tibiae a little longer than the femur, about 6 times as long as wide, about twice as long as the tarsus; tarsi long, somewhat swollen on the basal half, 1-jointed, about 4.5 times as long as wide, lacking digitules; claws stout, without denticles. Abdominal segments fused together, a ventral cicatrix of medium size, which is about 0.21 mm. in the longest diameter. Anal opening far separated from the posterior end, the



Lecaniodrosicha lithocarpi n. sp.
(Adult female)
Fig. 1. Antenna. Fig. 2. Front leg.

tube well developed, with many pores at the inner end. Spiracles? stout, strongly chitinized, with large openings, the sides of orifices with numerous pores densely placed, 7 pair on the abdominal dorsum, of which the posterior ones are smaller. Derm except on the middle area of the abdominal venter chitinized, brownish when treated with potash, with many small circular pores scattered among the capitate setae, which pores are almost as large in diameter as the base of the seta, much fewer than the setae, with 4 minute openings at the center, those on the cephalothoracic venter somewhat larger, more numerous, with larger openings; several small groups of circular pores, and numerous circular pores, many long setae not capitate and many short stout spines with rounded apices densely scattered around the anal opening; 7 pairs of small much chitinized areas lacking setae, but with many circular pores in a very dense group (Fig 6), between the rows of abdominal spiracles?; a longitudinal row of similar 7 areas outside of each spiracle row on the abdominal dorsum, some similar areas also on the lateral sides; middle area of abdominal venter membraneous, thin, with many small circular pores which are as large as the dorsal ones, with a trilocular area at the center, and many normal long curved setae scattered; numerous circular pores somewhat larger than the above mentioned pores, with a smaller central trilocular area, and numerous shorter stiff setae, in a large dense group around the genital opening, the group not reaching the lateral margin.



Lecaniodronicha lithocarpi n. sp.

(Adult female)

Fig. 1. Pores and setae on abdominal venter.
Fig. 2. Pore on abdominal venter.
Fig. 3. Capitate seta.
Fig. 4. Spine near anal opening.
Fig. 5. Dorsal pore.
Fig. 6. Group of pores on derm.
Fig. 7. One of abdominal spiracles?
Fig. 8. Inner end of anal tube.
Fig. 9. Pore on venter of cephalothorax.

Length of body with secretion—about 11–12 mm. Width of body—about 7.5 mm. Height of body—about 6.0 mm. Length of antenna—about 1.1 mm. Hind femur—about 0.65 mm. Hind tibia—about 0.76 mm. Hind tarsus—about 0.42 mm. Diameter of dorsal pore—about 0.012 mm. Diameter of anal opening—about 0.125 mm.

Host.—Lithocarpus sp.

Hab.—Suisha.

A few adult females were collected by Mr. M. Kato on May 16, 1928.

Asterolecanium pasaniae Kuw. et Ckll.

Jl. New York Ent. Soc., XVII, p. 152 (1909); Kuwana, Illust. Monog. Jap. Cocc. (Nihon Kaigaramushi Zusetsu), II, p. 83 (1917).

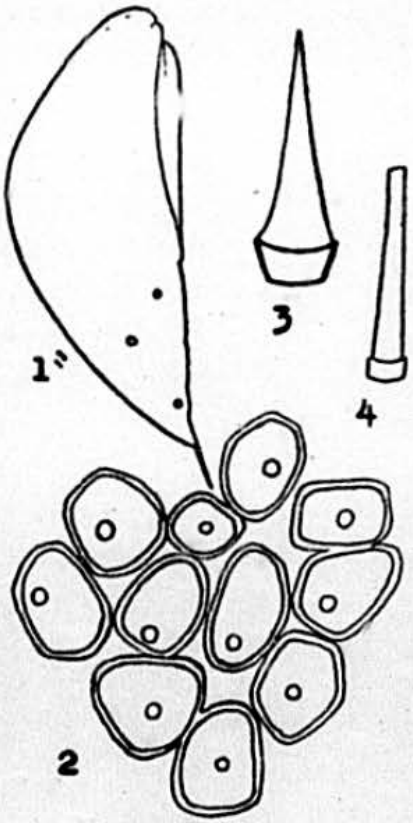
Host.—Lithocarpus sp.

Hab.—Suisha.

Very common near Suisha. Previously known from Japan. Some of my specimens have been compared with the tpye specimen by Dr. H. Morrison.

Saissetia armata n. sp.

(Adult female) Brownish black, somewhat shining. Body strongly chitinized, granulated on the dorsal surface, nearly similar in shape to *Saissetia hemisphaerica* Targ., with about 5 or less very inconspicuous blunt ridges on the lateral margin of body, somewhat elevated on the marginal areas of the anal cleft, forming a ridge. Dorsal derm with areolations over the whole surface which are similar to those of *Saissetia nigra* Nietn., but smaller, with small pores. Antennae 8-jointed, somewhat tapering, with a few very long bristles; the 1st joint a little wider than long; the the 2nd 1.5 times as long as wide; the 3rd twice as long as wide; the 4th very slightly longer than wide; the 5th the longest, thrice as long as wide, with a faint constriction near the tip; the 6th and 7th a little longer than wide; thn 8th about twice as long as wide, with some long bristles; the relative length of joints about as follows: I—9, II—14, III—14, IV—8, V—18, VI—8, VII—7, VIII—11. Spiracles widely expanded at the tip, less so on the base, lacking pores, with seme areolations a tche base. Legs short, with no pores; hind tibiae almost as long as the femur, but a little longer than the tarsus; hind tarsi with 2 constrictions; tarsal digitules very long, slender; claws with 2 very stout shorter digitules. Marginal setae numerous, short, stout, spine-like as in *Saissetia auriculata* Morr., but a little constricted just at the base, arranged in a single row, slightly variable in length; those on the



Saissetia armata n. sp.
(Adult female)
Fig. 1. Anal plate.
Fig. 2. Dorsal areolations.
Fig. 3. Marginal seta.
Fig. 4. Stigmatic spine.

posterior end longer. Some 30 small obtuse tubercles present along the body margin. Stigmatic clefts absent; stigmatic spines 3, stout, somewhet tapering, not curved, truncate at the tip, one of which is longer, twice as long as the shorter; the shorter ones as long as or slightly longer than the marginal seta. Anal ring small, with 8 long bristles which are as long as the anal plate. Anal plates broadly rounded on the outer margin, rounded at the base, more or less pointed at the tip, slightly more than twice as long as wide. Ventral side faintly reticulated on the posterior portion, with many small circular pores sparsely scattered and many somewhat larger circular pores on the genital area.

Length of body—about 3.5–4.0 mm. Width of body—about 2.7–3.0 mm. Height of body —about 1.7 mm. Length of antenna—about 0.415 mm. Hind tibia—about 0.13 mm. Hind tarsus—about 0.092 mm. Marginal seta—about 0.022 mm. Spiracle—about 0.092 mm. Anal plate—about 0.22 mm. Width of anal plate —about 0.092 mm. Length of anal cleft—about 0.92 mm. Longer stigmatic spine—about 0.042 mm. Hind tarsal digitule—about 0.055 mm. Diameter of anal ring—about 0.065 mm.

Hosts.—Glochidion arnottianum, Eugenia jambos, attacking the branch.

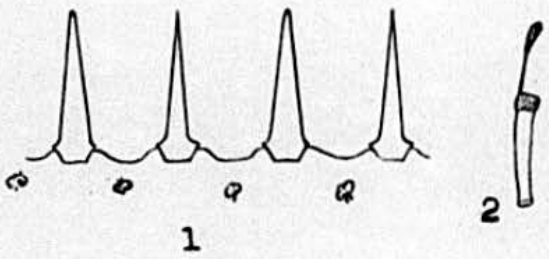
Hab.—Kuraru near Koshun.

Many adult females were observed by the author in a large nest of Crematogaster in June 1928. This species is very peculiar in possessing acute fusiform marginal setae, which distinguish it from any other species of *Saissetia*, except *Saissetia auriculata* Morr., and differs from *S. auriculata* Morr. in the shape of body, etc.

Inglisia formosana n. sp.

(Adult female) Almost yellowish brown, whitish on the area below the end of a dorsal transverse furrow. Test oval, broadly rounded on both ends, strongly convex

above, rising steeply, composed of 2 plates meeting along a median longitudinal line, possessing a narrow transverse furrow at the middle, a little convex at each end of the furrow, easily separable from the skin, white, slightly covered with very thin greyish secretion easily removable, with many delicate lines radiating from the end of the furrow towards the margin, somewhat shining. Body shining blackish brown in dried specimens, broadly oval, steeply convex on the dorsum, with a distinct narrow longitudinal median carina along the whole length and a deep transverse furrow at the midde, the dorsum entirely covered with the test. Antennae short, rather stout, 6-jointed, a little longer than the hind coxae, with a few long bristles; the 1st joint short, much wider than long; the 2nd short, wider than long; the 3rd somewhat swollen on one side, about 2.5 times as long as wide, a little longer than the last 3 joints taken together, with 2 bristles on the distal end which are a little longer than the 4th joint, sometimes with a small oval transparent area about the middle and a trace of division near the distal end; the 4th almost as long as wide, slightly narrowed towards the base, with a stout long bristle near the apex; the 5th somewhat wider than long; the 6th as long as wide, with some very stout bristles; the relative length of joints about as follows: I—8, II—8, III—24, IV—8, V—7, VI—7. Legs small, with a few setae; coxae large, narrowed towards the distal end, hind coxae somewhet longer than the tibia, about 1.7 times as long as wide, wanting pores, with a long bristle at the distal end; trochanters not well defined from femur, with a very long bristle near the distal end; hind femora very stout, convex, as long as the tibia, about twice as long as wide, with a short seta at the end; hind tibiae about 4 times as long as wide, about 1.6 times as long as the tarsus, with a long stout seta near the tip; tarsi not well defined from the tibia, with 2 very long stout knobbed hairs; claws short, without denticles, with 2 very stout knobbed digitules. Rostrum very short. Spiracles stout. Anal cleft strongly chitinized on the margins around the anal plates. Anal plates somewhat divergent, rounded on the tip, with a few spine-like setae on the apical part, and a very short blunt protuberance on the inner side near the apex. Anal-ring setae 6, long, stout, not



Inglisia formosana n. sp.
(Adult female)
Fig. 1. Marginal setae and pores.
Fig. 2. Tubular duct.

dilated, reaching beyond the anal plates. Stigmatic clefts not developed, with a stout conical spine which is rounded at the tip, somewhat larger than the marginal spine; a small chitinized part present near each stigmatic spine on the venter; about 20–25 very small circular pores in a group near the stigmatic spine, most of which are on the chitinized part; some similar pores scatterel between the spiracle and the chitinized part. Marginal spines numerous, conical, regularly arranged in a row along the whole margin, but in short double rows near the anterior stigmatic spine, of 2 types alternating with each other; (1) stout spines about 3 times as long as wide, stout, pointed or slightly rounded at the tip, (2) slender spines as long as the other type, but slender, sharply pointed (basal part of the slender seta as stout as that of the stouter type); distance between any 2 spines much shorter than the spine. A single row of binocular minute pores with 2 minute protuberances present along the whole row of the marginal spines and the margins of the anal cleft, pores along the marginal spines equal in number to the spines. Dorsum with very few minute circular pores very sparsely scattered and a median longitudinal row of many minute binocular pores which are similar to those on the body margin, not arranged in a single row, intermixed with some larger circular pores. Venter with numerous slender ducts sparsely scattered which are shorter than the marginal spine, and some small circular multilocular pores similar to those between the spiracle and body margin.

Length of test—about 6.0 mm. Width of test—about 4.0 mm. Height of test—about 3.0 mm. Length of dorsal furrow on test—about 3.0 mm. Body—about 5.5 mm. Width of body—3.5 mm. Length of antenna—about 0.22 mm. Marginal spine —about 0.032 mm. Distance between marginal spines—about 0.014 mm.

Host.—Pirus serotina, attacking the branch.

Hab.—Shirin.

Two adult females were collected by the author on February 28, 1930 on a young host tree. This species is closely allied to *Inglisia bivalvata* Green, but differs in the following characters: (1) Marginal spines of 2 types. (2) Distance between any 2 marginal spines much shorter than the spine. (3) Maginal pores along the rows of spines, but not between them.

These species are not typical species of *Inglisia*, the margins of the anal cleft being strongly chitinized, but now I place them in this geuns.

Aclerda japonica Newst.

Fernald, Cat. Cocc. World, p. 210 (1908); Newstead, Monog. Brit. Cocc., II, p. 11 (1902).

Host.—Saccharum officinarum, attacking the root and the stalk.

Hab.—Kori, Shinka.

A few fe: les were collected by Mr. M. Yanagihara. Hitherto unrecorded from Formosa.

Aulacaspis crawii Ckll.

Fernald, Cat. Cocc. World, p. 233 (1903); Kuwana, Dept. Finance, Imp. Plant Quar. Serv., Tech. Bull. 4, p. 25 (1926).

Hosts.—Hibiscus tiliaceus, Melia azedarach, attacking the stem and branch.

Hab.—Taihoku, Maruyama, Tansui.

Common, sometimes occurring in large numbers and usually being found on the lower part of the stem. New to Formosa. The Formosan specimens differ from Kuwana's description in the stouter median lobes, but may be this species. I have some specimens collected at Foochow, China, by Prof. C. R. Kellogg, which agree with the Formosan examples.

Phenacaspis manni Green.

Chionaspis manni, Green, Mem. Dept. Agr. Ind., Ent. Ser., vol. 1, no. 5, p. 344 (1907).

Host.—Diospyros discolor.

Hab.—Kuraru.

Many females were collected by the author in June 1928. Hitherto unrecorded from Formosa. Some of my specimens have been kindly examined by Mr. E. E. Green.

Lepidosaphes hawaiensis Mask.

Fernald, Cat. Locc. World, p. 309 (1903): Green, Ann. Mag. Nat. Hist., ser. 10, I, p. 152 (1928).

Lepidosaphes moorsi, Doane and Ferris, Bull. Ent. Res., VI, p. 401 (1916).

Host.—Pirus serotina, attacking the branch.

Hab.—Shirin.

Many adult females were collected by the author on February 28, 1930. New to the fauna of Formosa.

Parlatoria cinerea Doane et Hadden.

Can. Ent., XLI, p. 299 (1909); Bellio, Boll. Lab. Zool. Portici, XXII, p. 227 (1929).

Host.—Citrus sp.

Hab.—Shirin.

A few females were collected by the late Mr. I. Nitobe on April 9, 1913. Hitherto unrecorded from Formosa.

Food Plant Catalogue of the Formosan Coccidae.

(Supplement)

Acalypha sp. (Euphorbiaceae).

Icerya aegyptiaca Dougl.

Asparagus sp. (Liliaceae).

Saissetia nigra Nietn.

Bambusa sp. (Gramineae).

Asterolecanium lanceolatum Green.

Asterolecanium pseudomiliaris Green, var. bambusifoliae Takah.

Chionaspis bambusifoliae Takah.

Chionaspis vermiformis Takah.

Eriococcus transversus Green.

Leucaspis bambusicola Takah.

Odonaspis simplex Green, var. formosana Takah.

Phenacoccus bambusae Takah.

Protodiaspis nigra Takah.

Pseudococcus bambusicola Takah.

Tsukushiaspis elongata Takah.

Tsukushiaspis formosanus Takah.

Tsukushiaspis neolinearis Takah.

Tsukushiaspis suishanus Takah.

Tsukushiaspis sp.

Bambusa stenostachya·

Asterolecanium minutum Takah.

Odonaspis simplex Green, var. formosana Takah.

Trionymus formosanus Takah.

Bischofia javanica (Euphorbiaceae).

Pseudaonidia trilobitiformis Green.

Calanthe sp. (Orchideae).

Ceroplastes rubens Mask.

Cinnamomum camphora (Laurineae).

Pseudaonidia duplex Ckll.

Citrus sp. (Rutaceae).

Parlatoria cinerea Doane et Hadden.

Pinnaspis aspidistrae Signt.

Cyatheaceae (A species of the).

Pinnaspis aspidistrae Signt.

Dendrocalamus latiflorus (Gramineae).

Odonaspis simplex Green, var. formosana Takah.

Diospyros discolor (Ebenaceae).

Aspidiotus lataniae Signt.

Phenacaspis manni Green.

Diospyros kaki.

Ceroplastes floridensis Comst.

Saissetia hemisphaerica Targ.

Duranta repens (Verbenaceae).

Ferrisiana virgata Ckll.

Eugenia jambos (Myrtaceae).

Saissetia armata Takah.

Ficus mysorensis (Urticaceae).

Saissetia oleae Bern.

Ficus retusa.

Laccifer greeni Chamb.

Glochidion arnottianum (Euphorbiaceae).

Saissetia armata Takah.

Glochidion hongkongense,
Aspidiotus excisus Green.

Gossypium indicum (Malvaceae).
Pseudococcus filamentosus Ckll.

Hibiscus tiliaceus (Malvaceae).
Aulacaspis crawii Ckll.

Lithocarpus sp. (Fagaceae).
Asterolecanium pasaniae Kuw. et Ckll.
Lacaniodrosicha lithocarpi Takah.

Mangifera indica (Anacardiaceae).
Aspidiotus lataniae Signt.

Melia azedarach (Meliaceae).
Aulacaspis crawii Ckll.
Lepidosaphes tubulorum Ferris.

Miscanthus sp. (Gramineae).
Odonaspis secreta Ckll.

Myristica heterophylla (Myristicaceae).
Ceroplastes ceriferus And.

Pirus serotina (Rosaceae).
Inglisia formosana Takah.
Lepidosaphes hawaiensis Mask.

Podocarpus macrophylla (Coniferae).
Chrysomphalus autantii Mask.

Psidium guyava (Myrtaceae).
Eucalymnatus tessellatus Signt.
Saissetia oleae Bern.

Rhododendron sp. (Ericaceae).
Cerococcus ficoides Green.

Saccharum officinarum (Gramineae).
Aclerda japonica Newst.

Styrax suberifolium (Styraceae).
Saissetia formicarii Green.

Terminalia catappa (Combretaceae).

Ferrisiana virgata Ckll.

L cifer greeni Chamb.

Thea chinensis (Ternstroemiaceae).

Ceroplastes rubens Mask.

Pseudaonidia duplex Ckll.

Some Coccidae of Loochoo.

Our knowledge of the coccid fauna of Loochoo is very incomplete, only the following species having been recorded from the islands;

Icerya purchasi Mask. (Yashiro, 1927)

Trionymus sacchari Ckll. (Takahashi, 1929)

Asterolecanium bambusae Boisd. (Kuwana, 1909, 1917).

Lecanium pseudomagnoliarum Kuw. (Yashiro, 1927).

Saissetia nigra Nietn. (Kuwana, 1909)

Ceroplastes rubens Mask. (Kuwana, 1917, 1923)

Prontaspis yanonensis Kuw. (Kuwana, 1911, 1923).

Parlatoria zizyphi Lucas. (Kuwana, 1911, 1925; Yashiro, 1927)

Chrysomphalus aonidum L. (Yashiro, 1927)

Chrysomphalus aurantii Mask. (Yashiro, 1927)

I made a trip to the islands in April 1930 and observed the species listed below.

(1) *Icerya purchasi* Mask.

Host.—Citrus sp.

Hab.—Nago (Okinawa), Naze (Amamioshima).

A few females.

(2) *Icerya seychellarum* Westw.

Host.—Eriobotrya japonica.

Hab.—Naze (Amamioshima).

A few females.

(3) *Pseudococcus lilacinus* Ckll.

Host.—Psidium guyava.

Hab.—Ishigaki.

Observed in abundance on a host tree, being attended by *Plagiolepis longipes*.

This species is usually associated with *Crematogaster rogenhoferi* in Formosa, but this ant is not found in Loochoo.

(4) *Antonina crawi* Ckll.

Host.—Bambusa sp.

Ha —Nago (Okinawa).

A few females were collected.

(5) *Asterolecanium bambusae* Boisd.

Host.—Bambusa sp.

Hab —Naze (Amamioshima).

Observed in large numbers.

(6) *Asterolecanium minutum* Takah.

Host.—Bambusa sp.

Hab.—Naze (Amamioshima).

A few females.

(7) *Coccus elongatus* Signt.

Host.—Codiaeum variegatum.

Hab.—Ishigaki.

(8) *Saissetia nigra* Nietn.

Hosts.—Ficus retusa, Morus alba, Sideroxylon sp

Hab.—Sonai (Iriomote), Ishigaki, Bishara (Miyako), Nago (Okinawa), Haneji (Okinawa), Naze (Amamioshima).

Very common.

(9) *Saissetia hemisphaerica* Targ.

Hosts.—Citrus sp., Cycas sp., Sideroxylon sp., Ixora chinensis.

Hab.—Sonai (Iriomote). Ishigaki, Bishara (Miyako), Naha, Nago (Okinawa), Naze (Amamioshima).

Very common.

(10) *Saissetia oleae* Bern.

Host.—A tree not identified.

Hab.—Nago (Okinawa).

Observed in large numbers on a tree. This species occurs also in Formosa, and Hokoto, as well as in the green houses of the Hokkaido University at Sapporo.

(11) *Paralecanium expansum* Green.

Host.—Ficus retusa.

Hab.—Bishara (Miyako), Haneji (Okinawa).

A few specimens were collected.

(12) *Pulvinaria polygonata* Ckll.

Hosts.—Citrus sp., Murraya exotica.

Hab.—Bishara (Miyako), Nago (Okinawa).

Common.

(13) *Ceroplastes floridensis* Comst.

Hosts.—Citrus sp., Ficus retusa.

Hab.—Bishara (Miyako), Naze (Amamioshima),

Common, but occurring in small numbers.

(14) *Aulacaspis yabunikkei* Kuw.

Host.—Cinnamomum sp.

Hab.—Naze (Amamioshima).

Observed in large numbers.

(15) *Diaspis pentagona* Targ.

Host.—Populus sp.

Hab.—Naze (Amamioshima).

Very abundant.

(16) *Fiorinia juniperi* Leon.

Host.—Podocarpus sp.

Hal.—Naha.

Common.

(17) *Parlatoria zizyphi* Lucas.

Host.—Citrus sp.

Hab.—Naha, Nago (Okinawa), Naze (Amamioshima).

Very common.

(18) *Chrysomphalus aonidum* L.

Host.—Citrus sp,

Hab.—Nago (Okinawa).

Very few.

Of the species now known to occur in Loochoo, *Trionymus sacchari* Ckll., *Pseudococcus lilacinus* Ckll., *Asterolecanium bambusae* Boisd., *Asterolecanium minutum* Takah., *Paralecanium expansum* Green and *Pulvinaria polygonata* Ckll. are distributed in Formosa, but not in Kyushiu and the islands north of it. On the other hand *Lecanium pseudomagnoliarum* Kuw. and *Prontaspis yanonensis* Kuw.* are the only species which are found in Japan proper, but not in Formosa; and all the remaining species are distributed both in Formosa and in Japan proper. These facts might be taken as an indication that the coccid fauna of Loochoo is more closely related to that of Formosa than to that of Japan.

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* These species were not collected by me in Loochoo.

(Literature)

Kuwana, I. 1909 Coccidae of Japan (iii). First supplemental list of Japanese Coccidae, or scale insects, with description of 8 new species. Jl. New York Ent. Soc., XVII, pp. 150-158.

Kuwana, I. 1911 日本介殻蟲圖說（前）

Kuwana, I. 1917 同 （後）

Kuwana, I. 1923 矢根介殻蟲及ルビー蠟蟲ニ關スル研究。農商務省病菌害蟲彙報、No. 10.

Kuwana, I. 1925 The Diaspine Coccidae of Japan, 1. Dept. Finance, Imp. Plant Quar. Serv , Tech. Bull. no. 1.

Takahashi, R. 1929 Observations on the Coccidae of Formosa, 1. Dept. Agr. Res. Inst., Formosa, Rept. no. 40.

Yashiro, H. 1927 A list of insects in Roo-choo Islands, no. 1.

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